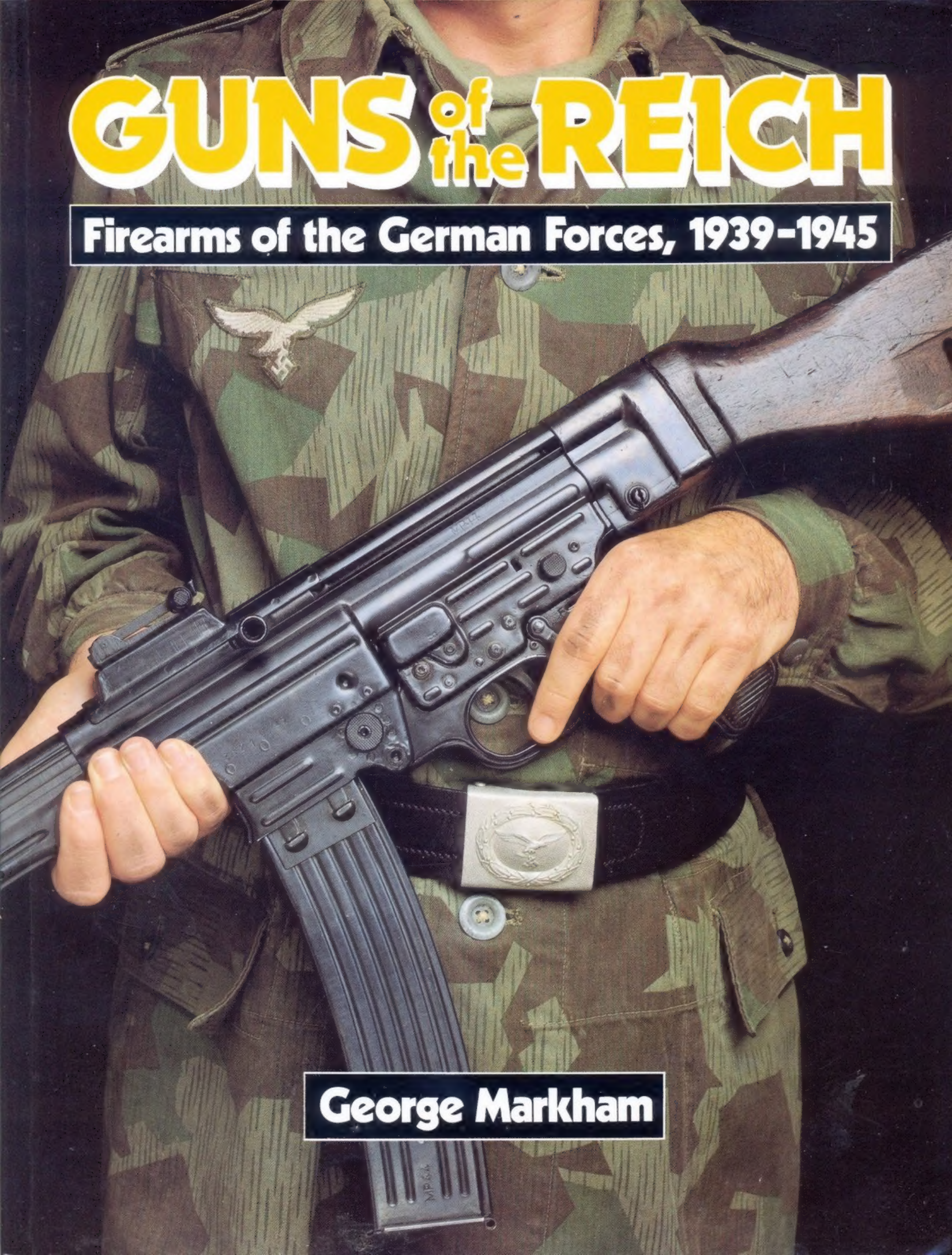


# **GUNS** of the **REICH**

**Firearms of the German Forces, 1939-1945**



**George Markham**



During the Second World War, German services and industry were able to provide weapons of unparalleled quality to their armed forces. The German war machine produced pistols, submachine-guns, rifles and machine-guns that ranged from the most revolutionary in design to the strange and dangerous. These armaments served the German military man in all his theatres of action, from snow-bound Norway and Russia to the hot, sandy climes of Libya and Tunisia.

George Markham, following the format of his international bestseller *Guns of the Elite*, has engaged in many years of research to produce this detailed and informative illustrated study. He traces the rise of the modern German military machine and explains the political, military and technological factors that influenced the production and development of these armaments.

- **Pistols** include the world-renowned P.08, the Parabellum or 'Luger', and its Walther-designed replacement; the many small-calibre blowbacks that served the officers, non-combatants and paramilitary forces; and guns such as the Austrian Repetierpistole M12, impressed into German service after the Anschluss of 1938.

- **Submachine-guns** include the original Bergmann MP.18, I which served into the Second World War in a modified form; the Erma and Bergmann designs of the mid-1930s; and the vaunted MP.38 series – the 'Schmeisser' – which is now synonymous with the German armed forces of the Second World War.

- **Rifles**, apart from the standard K.98k, include Mauser-type guns made in sequestered factories as well as the earliest semi-automatic rifles; coverage is also given to the short-case intermediate cartridge devised in the 1930s, and the development to perfection of the first truly successful assault rifle – the Maschinenpistole MP.43.

- **Machine-guns** described include the standard Maxim legacy of an earlier conflict, the MG.08, together with the steps made in the inter-war years to develop a satisfactory general-purpose gun (destined to be the MG. 34). The perfected MG.42 and the host of impressed weapons are also featured.

- **Support weapons** describe signal pistols, training equipment, optical sights and the standard anti-tank rifles, plus some of the stranger weapons that were developed to replace them – the Gerlich squeezebore guns,

*Continued on back flap*









# GUNS<sup>OF</sup>THE REICH





# **GUNS OF THE REICH**

**Firearms of the German Forces, 1939-1945**

**GEORGE MARKHAM**



ARMS AND ARMOUR PRESS



First published in Great Britain in 1989 by  
Arms and Armour Press,  
Artillery House, Artillery Row, London SW1P 1RT.

Distributed in the USA by  
Sterling Publishing Co., Inc.,  
387 Park Avenue South, New York, NY 10016.

Distributed in Australia by  
Capricorn Link (Australia) Pty. Ltd  
P.O.Box 665, Lane Cove, New South Wales 2066,  
Australia.

© George Markham, 1989

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#### British Library Cataloguing in Publication Data

Markham, George  
Guns of the Reich  
1. Germany. Heer.  
– Military equipment  
2. Firearms, History

I. Title  
623.4'4'0903

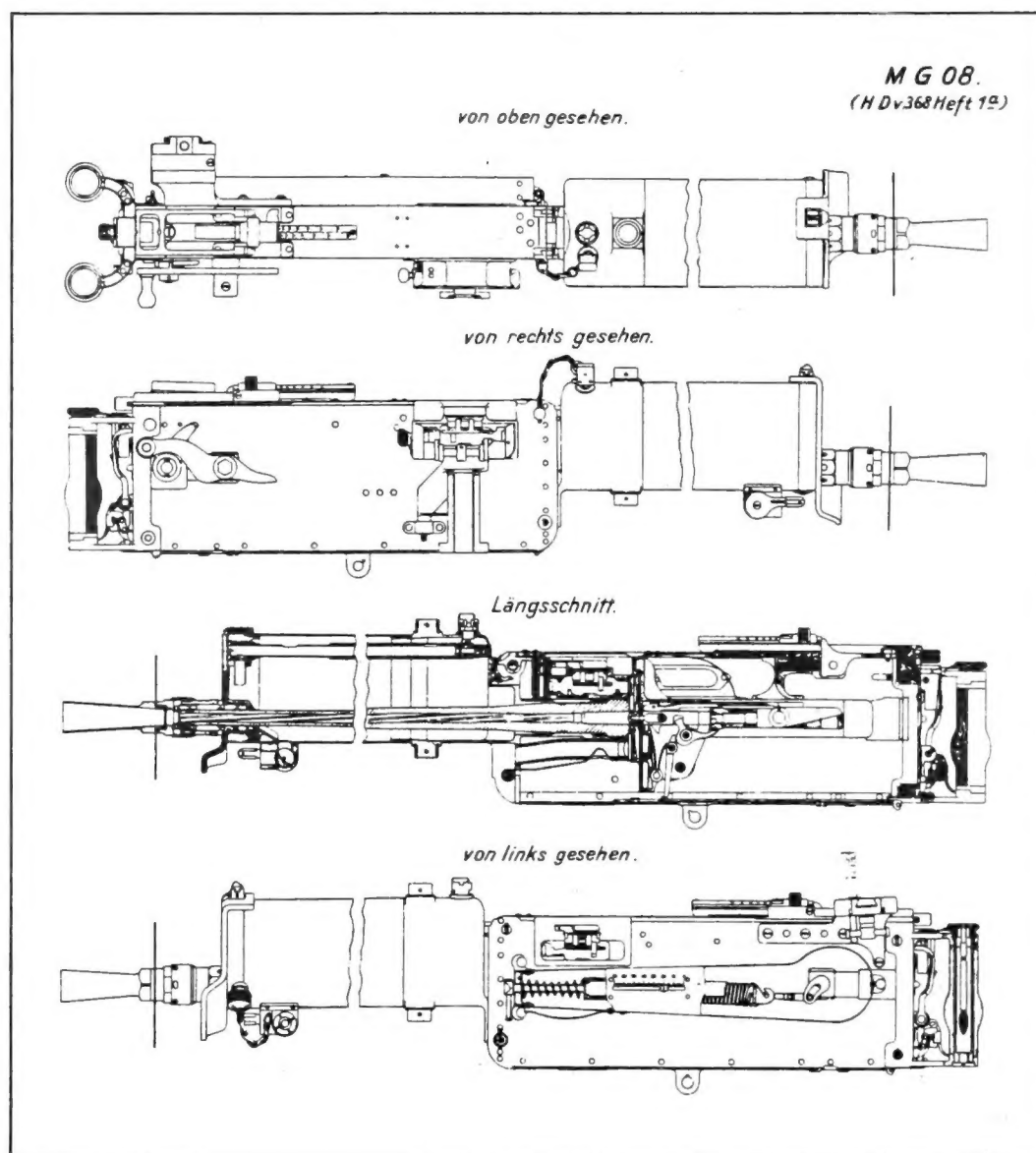
ISBN 0-85368-965-2

#### 1 TITLE PAGE

Used on half-titles throughout the book, this pen-and-ink drawing by John Walter is loosely based on a pencil sketch of an MG.34 team by the noted German war artist Hans Liska – whose work is so often used without due credit.

#### 2 RIGHT

The MG.08 from the standard Reichswehr manual, H.Dv.368, c.1922.



Produced by The Lyon Press Ltd;  
designed and edited by John Walter.  
Camerawork by Service Twenty Four Ltd,  
Brighton, East Sussex.  
Printed and bound in Great Britain by  
The Bath Press, Bath, Avon.



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# ACKNOWLEDGEMENTS

This book follows in the footsteps of the highly successful *Guns of the Elite*, originally published in 1987 (in paperback, 1989). However, though *Guns of the Reich* presents a similar combination of background history with the more technical information, problems are inevitably encountered with a historical rather than contemporary topic. Though the subject of German weapons design has been dissected in great detail in many very learned publications, some of which are listed in the Bibliography, there have been few attempts to provide an accurate *one-volume* guide.

Arms & Armour Press, in its pre-Cassell Group days, produced a series of small books amongst which was the pioneering *German Infantry Weapons of World War II*, first published in 1969. It is hoped that the present book will provide the 'German Infantry Weapons', or accessible guide, of the 1990s: perceptive readers may even note that *Guns of the Reich* and its modest predecessor share illustrations drawn from the same official sources.

Unfortunately, some areas of German firearms design have been investigated in far greater detail than others; subjects such as the Parabellum pistol and the assault rifles, for example, have been subjected to minute scrutiny. But much less is known about the infantry rifles, or about the progress of anti-tank weapons. The content of *Guns of the Reich* must inevitably reflect this inconsistency, though I hope to have avoided the most obvious howlers – such as claims that the MG.42 is a Mauser design, most recently made in Bruce Quarrie's *Weapons of the Waffen-SS*! But I am well aware that no book is flawless, and would be pleased to acknowledge mistakes if more accurate details are forthcoming.

In common with authors everywhere, I must acknowledge several of the most important books that proved invaluable during my study. The pistols section of *Guns of the Reich* would have been the poorer had it not been for John Walter's *The Luger Book* (Arms & Armour Press, 1986) and Jan Still's *Axis Pistols: The Pistols of Germany and Her Allies in Two World Wars* (privately published, 1986); coverage of submachine-guns benefitted from Nelson & Lockhoven's *The World's Submachine Guns* (International Small Arms Publishers, Köln, Germany, 1963), while information about the rifles was extracted from John Walter's *The German Rifle* (Arms & Armour Press, 1979, to be re-issued in a radically differing form in 1990) and Musgrave & Nelson's *The World's Assault Rifles & Automatic Carbines* (TBN Enterprises,

Alexandria, Virginia, USA, c.1967). The machine-guns chapter owes a debt to Musgrave & Oliver's *German Machineguns* (MOR Associates, Friendship Station, Washington DC, USA, 1971); and the ammunition section to Daniel Kent's *German 7.9mm Military Ammunition, 1888-1945* (privately published, 1973).

The content of *Guns of the Reich* would also have been much poorer without the enthusiastic co-operation of many leading authorities in the field. I am, therefore, particularly glad to acknowledge the assistance of John Walter, who produced the book, and through him:

- John H. Batchelor, for the excellent exploded-view drawing on page 53.
- The Bundesarchiv, Koblenz, and the Department of the Army, Washington DC, USA, for assistance with photographs on pages 36, 90, 108 and 142.
- Warren H. Buxton, author of *The P.38 Pistol*, for photographs reproduced on pages 57-8.
- Brian L. Davis, Sanderstead, Surrey, for the picture on page 95.
- Deutsches Patentamt, München, West Germany, for the patent drawings on page 104.
- Dr Rolf Gminder, of Heilbronn, West Germany, for supplying material from his personal archives, in addition to photographs on pages 62 and 104-5.
- Joachim Görtz of München, West Germany, for seeking out many of the original photographs and then making the glossary one of the best – if not the best – to appear in an English-language publication of this type.
- Colin Greenwood, editor of *Guns Review*, for assistance in locating information.
- Her Majesty's Stationery Office, London, for permission to reproduce the maps and diagrams on pages 42-3, 58 and 96.
- Ian Hogg, author of relevant books and articles, for supplying many of the photographs found throughout the book.
- Tom Knox of St Louis, Missouri, USA, for some of the photographs on page 62, taken by Rod Stout.
- David Penn, Keeper of the Department of Exhibits, and Paul Kemp of the Department of Photographs, Imperial War Museum, for their much appreciated assistance with illustrations found on pages 6, 29, 36, 38 and 133-4.
- Karl Schäfer of Pirmasens, West Germany, who supplied most of the signal-pistol illustrations on pages 73-8.
- Joseph J. Schroeder Jr, for photographs reproduced on pages 58 and 60.
- Schweizerische Industrie-Gesellschaft, for the photograph reproduced on page 44.

● Jim Stanley of Startforth, County Durham, England, for information drawn from his fascinating articles in *Guns Review*.

● Masami Tokoi of Düsseldorf, West Germany, for kindly supplying the photographs reproduced on pages 52 and 70.

● Henk Visser of Wassenaar, the Netherlands, for the picture on page 63.

● Weller & Dufty, Birmingham, for the photograph on page 142.

● Herbert J. Wootend, custodian of the Pattern Room Collection in the factory of Royal Ordnance plc, Enfield Lock, for supplying many of the best photographs used throughout the book.

Lastly, I would wish to express my thanks to Lionel Leventhal, once of Arms & Armour Press but now Greenhill Books, under whose guidance the 'Guns of the...' series was originally created; to Roderick Dymott of Arms & Armour Press, whose unabated enthusiasm for the series has contributed so greatly to its continuing success; and to Tony Scott and Paul Ford of Service Twenty Four Ltd, Brighton, for processing the pictures and base-film under particularly trying circumstances.

In the final analysis, however, the responsibility for omissions and undetected mistakes remains mine alone.

George Markham  
Ashby de la Zouch, 1989.



---

## THE GLOSSARY

---

Key military, organisational and technical terms associated  
with the Wehrmacht and the guns of the Reich.



# GLOSSARY

Throughout *Guns of the Reich*, the original German names have been used for towns – e.g., München for 'Munich', Nürnberg for 'Nuremburg' – but not for provinces such as Bavaria and Prussia, unless they occur unavoidably in company names. No attempt has been made to indicate the differing genders in the following glossary; the dual-language *Wörterbuch der Waffentechnik* by Glück & Görtz (Journal-Verlag Schwend GmbH, Schwäbisch Hall, 1972) provides more comprehensive coverage.

Abteilung: battalion (artillery), detachment.  
 Abzug: trigger. -/sbügel, trigger-guard;  
 -/sfeder, trigger spring; -/shebel, trigger lever;  
 -/sstange, sear or trigger-bar.  
 Aktiengesellschaft: joint-stock company.  
 alter Art (a.A.): old pattern.  
 Amboss, Amboß: anvil (in a primer).  
 amtlich: official.  
 ansteckbar: detachable.  
 Ansteckmagazin: detachable magazine.  
 aptiert: adapted.  
 Armee: army.  
 Artillerie: artillery.  
 aufklappen: tipping.  
 Aufrüstung: rearmament.  
 Aufschlag: impact. -/punkt, point of impact;  
 -/zünder, impact fuze.  
 aufsteckbar: detachable.  
 ausbrennen: to erode.  
 Auslösung: release.  
 Ausführung: pattern, model, type.  
 ausrüsten: to arm, equip, outfit.  
 Ausschuss: scrap, waste.  
 Ausstosser or Auswerfer: ejector.  
 Auszieher: extractor.  
 automatisch: automatic.  
 Backe: cheekpiece.  
 Bajonett: bayonet ('Seitengewehr' was generally used in German service for all but socket bayonets).  
 Balkenkorn: square-post sight.  
 Bataillon: battalion.  
 Batterie: battery (of artillery).  
 Bau: construction.  
 bayerisch: Bavarian.  
 Bayern: Bavaria.  
 Bedienung: i) operation, ii) gun crew.  
 Befestigung: i) attachment, fastening, ii) fortification.  
 Behälter: case.  
 Behörde: authorities.  
 Belgien: Belgium.  
 belgisch: Belgian.  
 Beobachtung: observation.  
 Beschiessung: bombardment.

Beschläge: fittings.  
 Beschreibung: specification.  
 Beschuss: proof.  
 Bestimmung: ordinance.  
 Bewaffnung: armament.  
 Bewegung: action. *doppelte*..., double-action.  
 Blättchen: flakes.  
 Blankwaffe: edged weapon.  
 Blech: sheet. -/behälter, metal container;  
 Stahl/-, sheet-steel.  
 Blei: lead. -/geschoss, lead bullet.  
 Blitzkrieg: 'lightning war'.  
 Boden: base, bottom.  
 Böhmen: Bohemia.  
 Bohrer: drill.  
 Bolzen: bolt, stud.  
 Bombe: bomb.  
 Brand: fire, incendiary.  
 Braunschweig: Brunswick.  
 breit: wide.  
 Bremse: brake.  
 Breslau: Wrocław, Poland.  
 brüniert: blued.  
 Brünn: Brno, Czechoslovakia.  
 Büchse: gun, rifle.  
 Bund: state, federation, federal.  
 Chrom: chrome, chromium.  
 Dachkorn: barleycorn (inverted 'V' or pyramidal) sight.  
 Dämpfer: buffer. *Schall*/-, silencer.  
 Dauer: continuity. -/feuer, automatic fire.  
 Deckel: cover, lid.  
 Dichtung: seal.  
 Dienst: service.  
 Donau: Danube.  
 Doppellauf: double barrel.  
 doppelt: double.  
 Draht: wire.  
 Drall: twist.  
 Dreh: turn. -/stütze, pedestal mount;  
 -/verschluss, rotary action.  
 Dreibein, Dreifuss: tripod.  
 dreieckig: triangular.  
 Druck: pressure.  
 Durchmesser: diameter.

Eierhandgranate: oviform grenade.  
 ein: one.  
 Einbau: assembly.  
 einfach: simple.  
 Einführung: adoption.  
 Einheits: standard, universal.  
 -/maschinengewehr, 'universal machine-gun'.  
 Einsatz: i) insert, ii) action, combat.  
 einschüssig: single-shot.  
 Einstecklauf: sub-calibre barrel insert.  
 Einzelfeuer: single-shot.  
 Einzellader: single-loader.  
 Einzellauf: single-barrel.  
 einzeln: singly.  
 Eisen: iron. -/bahn, railway; -/kern, iron core.  
 Elsass: Alsace.  
 Energie: power.  
 Entfernung: distance.  
 Entladung: discharge.  
 Entwurf: design, project.  
 Erhöhung: elevation.  
 erproben: to test.  
 Ersatz: substitute, replacement.  
 explodieren: to burst.  
 Fabrik: manufactory.  
 Fahrrad: bicycle.  
 Fallschirmjäger: paratrooper.  
 Faustfeuerwaffe: handgun.  
 Feder: spring.  
 Feld: field, land (rifling). -/artillerie, field artillery.  
 fest: compact, rigid.  
 Feuer: fire.  
 Filz: felt.  
 Firmenzeichen: factory sign, logo.  
 Flak (Flugzeugabwehrkanone): anti-aircraft gun.  
 Flammen: flames. -/werfer, flame thrower.  
 Flieger: airman. -/pistole, signal pistol for airborne use.  
 Frankreich: France.  
 französisch: French.  
 Fremdgerät: foreign equipment.  
 Führung: guide. -/sband, drive-band.  
 Fussartillerie: foot artillery.  
 Gabelstütze: bipod mount.  
 Gas: gas.  
 gasdicht: gas-tight, gas-sealed.  
 Gasdrucklader: gas-operated firearm.  
 geändert: altered.  
 Gebirge: mountains.  
 Gebirgsjäger: mountaineer, mountain troops.  
 gebogen: curved. -/er Lauf, curved barrel.  
 gehärtet: hardened.  
 Gehäuse: housing, receiver, breech.  
 geheim: secret.  
 Geheime Staatspolizei: (Gestapo), secret police.





### 3 ABOVE

Changing the guard at the Reichspräsidenten-Palais, Berlin, c.1932. Note that the policeman on the extreme left is wearing his pistol holster on the right side rather than the left. *LPI archives.*

geladen: loaded.

Gelenk: joint.

Genossenschaft: association, co-operative.

Gemeinschaft: union, commune.

Geradzugverschluss: straight-pull action.

Geräte: equipment.

geriffelt: ribbed, cannellured.

Geschoss: bullet.

Geschütz: gun, cannon.

Geschwindigkeit: velocity.

Gesellschaft: company.

gesichert: secured.

Gewehr: rifle, shotgun. *-/granate*, rifle grenade.

Gewinde: thread.

gezogen: rifled.

glatt: smooth.

gleiten: to slip, glide.

GmbH (Gesellschaft mit beschränkter Haftung): limited liability company.

Granate: grenade, shell.

Griff: grip, handle.

gross, groß: large.

Gurt, Gürtel: belt. *Patronen/-*, cartridge-belt; *-/trommel*, belt-drum.

Hahn: hammer.

hahnlos: hammerless.

Hannover: Hanover.

Halter: catch.

Hand: hand, shoulder. *-/feuerwaffe*, smallarm;

*-/schutz*, handguard.

hart: hard, solid.

Hebel: lever.

Heer: army. *-/eswaffenamt* (HWaA), army weapons office.

Hersteller: manufacturer, producer.

Hilfskorn: auxiliary front sight.

Hinterlader: breechloader.

Holland: the Netherlands.

holländisch: Dutch.

Holz: wood.

Hülse: i) case, ii) chamber (of a rifle).

*Patronen/-*, cartridge case.

infrarot: infra-red.

Inspektion: inspection, perusal, section. ... *für Waffen und Gerät* (IWG), the predecessor of the HWaA.

Instandsetzung: repair.

Jäger: hunter, rifleman.

kaiserlich: imperial. *-/e Marine*, imperial navy.

Kaliber: calibre.

Kammer: bolt.

Kampf: combat, struggle, fight. *-/gruppe*, battle group; *-/pistole*, 'battle pistol'; *-/stoff*, poison.

Karabiner: carbine.

Kartusche: cartridge(-case).

Kasten: box. *Patronen/-*, cartridge box.

Kavallerie: cavalry.

Kennzeichen: marking(s).

Kimme: sight notch.

Kipplauf: dropping barrel.

Klammer: clasp, latch.

Klappschaft: folding stock.

klein: small.

Klemme: clamp.

Kompagnie (pre-1918), Kompanie (post-1918): company (of a regiment).

Köln: Cologne.

königlich: royal. *-/e Gewehrfabrik*, royal rifle factory.

Körper: body.

Kolben: butt. *-/ring*, butt swivel.

Kopf: head. *-/zünder*, nose-fuze.

Korn: front sight.

Kraft: energy, power.

Krieg: war. *-/smarine*, navy.

Kriminal: criminal. *-/polizei*, detectives.

Krummlauf: curved barrel.

Kühlmantel: cooling jacket.

Kugel: ball.

Kunststoff: plastic.

Kupfer: copper. *-/mantelgeschoss*, copper-jacketed bullet.

kurz: short.

lackiert: lacquered.

Ladung: charge, loading.

Lafette: carriage, mount.

Land: land, district. *-/espolizei*, state police;

*-/sturm*, 'over-age' reserve; *-/wehr*, the eligible reserve.

lang: long.

Lauf: barrel. *-/los*, barrelless.

Legierung: alloy.

leicht: light, lightweight.

# GERMANY WEHRKREISE

Headquarters of wehrkreise  
are underlined doubly.  
Headquarters of active  
divisions singly.





## 4 LEFT

This map of Greater Germany – taken from the official British *German Order of Battle*, published in 1944 – shows the administrative districts (Wehrkreise) into which the area was divided. By courtesy of HMSO; Crown Copyright.

- Leichtmetall: aluminium.  
 Leistung: efficiency.  
 Leiter: leader.  
 Leitfaden: instruction, order.  
 leuchten: to illuminate, shine.  
 Leuchtgeschoss, Leuchtgeschöß: star-shell.  
 Leuchtpistole: flare pistol.  
 Leuchtspur: tracer.  
 Lieferung: delivery.  
 links: left(-hand).  
 Linse: lens.  
 Loch: hole, cavity.  
 Los: lot (delivery).  
 Luft: air. -/waffe, airforce; -/waffewaffenamt (LWaA), airforce weapons office.  
 Lüttich: Liège, Belgium.  
 Magazin: magazine.  
 Mähren: Moravia.  
 Mantel: (bullet-)jacket.  
 Marine: navy, naval. -/waffenamt (MWaA), navy weapons office.  
 Maschinen: machines. -/gewehr (MG), machine-gun; -/karabiner (MKb), machine carbine; -/pistole (MP), machine-pistol or submachine-gun.  
 Masseverschluss: blowback action.  
 Maßstab: scale.  
 Mehrlader: repeater.  
 Messing: brass.  
 Militär: military.  
 Minen: mines. -/werfer, mortar.  
 Modell: model, pattern, type.  
 Montage: assembly.  
 Mörser: mortar.  
 München: Munich.  
 Mündung: muzzle.  
 Munition: ammunition, munitions.  
 Muster: pattern, model.  
 Mutter: nut.  
 nah(e): close.  
 Nahkampf: close-combat.  
 Nahpatrone: short-range (reduced power) cartridge.  
 Nahkampfwaffe: close-range or personal protection weapon.  
 Nebel: smoke.  
 neuer Art (n.A.): new pattern.  
 Nieder: lower, as in the district of Lower Saxony (Niedersachsen).  
 Nürnberg: Nuremberg.  
 Ober: upper, higher (e.g., Oberschlesien, 'Upper Silesia'); -/kommando, high command (e.g., Oberkommando der Wehrmacht, armed forces high command).  
 Öffnung: opening, hole.  
 Öl: oil.  
 öldicht: oil-seal(ed), oil-tight.  
 Österreich: Austria.  
 österreichisch: Austrian.  
 Panzer: i) armour, ii) tank. -/abwehrkanone (Pak), anti-tank gun; -/büchse (PzB), anti-tank rifle.



- Patrone: cartridge.  
 Pistolen: pistols. *-/patrone* (Pist.Patr.), pistol cartridge. *-/tasche* (PT), holster.  
 Platzpatrone: blank cartridge.  
 Polen: Poland.  
 polnisch: Polish.  
 politisch: political.  
 Polizei: police.  
 Prag: Prahá (Prague), Czechoslovakia.  
 Prägeteile: stampings.  
 Präzision: accuracy.  
 Preussen, Preußen: Prussia.  
 preussisch, preußisch: Prussian.  
 Probe: experiment, trial, sample.  
 prüfen: to examine.  
 Puffer: buffer.  
 Pulver: propellant, powder.  
 Querbolzen: crossbolt.  
 Rahmen: frame, receiver.  
 Rand: rim, edge.  
 Rast: groove, click.  
 Rauch: smoke.  
 rauchlos: smokeless.  
 recht: right(-hand).  
 Regulierung: adjustment.  
 Reich: empire, state. *-/stag*, parliament (pre-1945); *-/ssicherheitshauptamt* (RSHA), 'Central State Security Office'; *-/swehr*, armed forces.  
 Reihen: series. *-/feuer*, series or automatic fire.  
*-/fertigung*, series or mass production.  
 Reinigung: cleaning.  
 Repetierlader: repeater.  
 Richtaufsatz: gunsight.  
 Riegel: bolt, latch.  
 Riffelung, Rille: cannelure, groove.  
 Rinne: groove, channel.  
 Riss, Riß: crack, split, rupture.  
 Röhren: barrels, tubes. *-/magazin*, tube magazine.  
 Rost: rust.  
 rostfrei: stainless or non-corrosive.  
 Rückstoss, Rückstoß: recoil.  
 Rückstossverstärker: muzzle booster.  
 Russland, Rußland: Russia.  
 russisch, rußisch: Russian.  
 Rüstung: armament.  
 Sachsen: Saxony.  
 sächsisch: Saxon.  
 Schaft: (gun-)stock.  
 Schalldämpfer: silencer.  
 Schieber: slider.  
 Schiess/en, Schieß/en: shooting. *-/platz*, shooting range.  
 Schlagbolzen: striker, firing-pin.  
 Schlaufe: swivel, loop.  
 Schlesien: Silesia.  
 Schliess/en, Schließ/en: to shut. *-/feder*, recoil spring.  
 Schlitten: slider, sledge.  
 Schloss, Schloß: lock.  
 schnell: fast, quick, rapid.  
 Schnellfeuer: rapid-firing.  
 Schnellwechsellauf: quick-change barrel.  
 Schraube: screw.  
 Schuss, Schuß: shot.  
 schussbereit, schußbereit: ready for action.  
 Schütze: rifleman.  
 Schutzstaffel (SS): defence guard.  
 Schwarzpulver: blackpowder (gunpowder).  
 schwenkbar: swivelling.  
 schwer: heavy.  
 Seitengewehr (SG): sidearm, knife or sword bayonet.  
 Selbstlade: self-loading.  
 sicher: safe, secure.  
 Sicherheitsdienst (SD): security service.  
 Sicherung: safety (catch).  
 Sinter Eisen: sintered iron.  
 Sockel: base.  
 Sonder: special.  
 Spange: clasp, buckle.  
 Spannabzug: double-action trigger.  
 spannen: to cock.  
 spitz: pointed.  
 Spitzgeschoss, Spitzgeschöß: pointed ('spitzer') bullet.  
 Sprenggeschoss, Sprenggeschöß: explosive bullet.  
 Spur: trace.  
 Stäbchen: strands, cords.  
 Stahl: steel.  
 Standvisier: fixed sight.  
 Stange: rod, pole.  
 Stark: strong.  
 Stift: pin.  
 Stoss, Stoß: shock, thrust. *-/trupp*, raiding party.  
 Streifen: strip, clip. *Lade/-*, charger.  
 Stumpf: blunt.  
 Sturm: assault. *-/gewehr*, assault rifle; *-/pistole*, assault pistol; *-/truppen*, assault troops.  
 Tasche: pocket, holster.  
 Teil: part, piece, component.  
 Träger: carrier, support.  
 treffen: to hit.  
 Treibladung: propellant charge.  
 Trommel: cylinder, drum. *-/magazin* (TM), drum magazine.  
 Tropen: tropics.  
 tschechisch: Czechoslovakian.  
 Tschechoslowakei: Czechoslovakia.  
 überzählig: spare.  
 Übung: practice, training.  
 umgeändert: modified.  
 Umschalter: selector, change-over switch.  
 Ungarn: Hungary.  
 ungarisch: Hungarian.  
 unter: below, beneath.  
 Unterbrecher: disconnecter.  
 Unternehmen: enterprise.  
 Untersuchung: inspection, examination.  
 Ursprung: origin.  
 veraltet: obsolete.  
 verbessert: improved.  
 Verbindung: connector.  
 verborgen: concealed.  
 Vergrößerung: magnification.  
 Verriegelung: lock.  
 Verschluss: action, bolt, breech-lock.  
 verstärken: to strengthen.  
 Versuch: trial, experiment.  
 verzögern: to delay.  
 Visier: back sight.  
 Volk: people. *-/sgewehr*, "people's gun"; *-/ssturm*, "assault people", last-ditch units; *-/swaffe*, "people's weapon".  
 Vorderschaft: fore-end.  
 Vorrichtung: device, mechanism.  
 Vorsatz: muzzle adaptor.  
 Vorschrift: instruction.  
 Waffe: weapon.  
 Walze: cylinder.  
 Warschau: Warszawa (Warsaw), Poland.  
 Warze: lug, stud.  
 Wasser: water.  
 wasserdicht: waterproof, watertight.  
 Wechsel: conversion, exchange.  
 Wehr: defence, protection.  
 Wehramt: operations section of the Reichswehr ministry (post-1918).  
 Wehrmacht: armed forces.  
 Werk: factory.  
 Weste: waistcoat, vest.  
 Westentaschenpistole: vest-pocket pistol.  
 wiederladen: to reload, handload (cartridges).  
 Wien: Vienna, Austria.  
 Wolfram: tungsten.  
 Wurfkörper: projector grenade.  
 Zange: pliers.  
 Zeichen: sign.  
 zeichnen: to draw.  
 Zeichnung: drawing.  
 Zeiger: pointer.  
 Zeit: time. *-/zünder*, time fuze.  
 Zerfall: disintegration. *-/gurt*, disintegrating-link belt.  
 Zeugamt: ordnance office.  
 Ziel: aim, objective. *-/einrichtung* or *-/gerät*, aiming equipment; *-/fernrohr*, telescope sight.  
 Zink: zinc.  
 Zinn: tin.  
 Zubehör: accessories.  
 Zubringer: follower, carrier.  
 Züge: rifling grooves.  
 Zünd'er: fuze. *-/hütchen*, primer.  
 zusammengesetzt: assembled.  
 Zusatz: supplementary.  
 Zweibein: bipod.  
 Zwilling: twin or double.  
 Zwing: clamp, holder.  
 Zylinder: cylinder.

# ONE

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## THE INTRODUCTION

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A brief history of the rise of the Wehrmacht and its weapons,  
the campaigns of 1938-45 and their relevance to smallarms  
design.



# INTRODUCTION

The history of the smallarms of the Third Reich is indissolubly linked with the rearmament programmes of the 1930s and the campaigns of the Second World War. It is also fraught with myth: particularly of Blitzkrieg ('lightning war'), or that German technology was far superior to that of her enemies. Consequently, the reputation of German weaponry has been over-exaggerated: insufficient attention has been paid to advances made in Britain, particularly, where at least some of the 'innovations' credited to German designers were foreseen.

## 5 BELOW

'Im Schützengraben. Ruhe nach der Schlacht' ('in the trenches; rest after the battle'): a 1915-vintage postcard published by E.A. Schwerdtfeger & Co. AG, Berlin. The original photograph, by Kühlewindt of Königsberg in Preussen, was clearly taken on the Eastern Front. *LPI archives.*

## THE REICHSWEHRZEIT

An immediate effect of the Treaty of Versailles, and a common belief in Germany that the military had been stabbed in the back by subversive elements in German society, was to undeservedly canonize many people and to force underground a militarism that had previously been overt. The Allies tried to smash the German military tradition by destroying war matériel and effectively re-drew the European map in an attempt to control political development. But deep-seated resentment arose from the loss of territory to old enemy France and emergent Poland and Czechoslovakia; thereafter, a primary aim of right-wing German politicians was to regain what had been lost.

After the dissolution of the state monarchies – the Kaiser had fled to the Netherlands – power was centralized in a constituent assembly, which first met on 6 February 1919 in the small provincial town of Weimar, remarkable chiefly as the residence of the poet Goethe. The 'Weimar Republic' is generally reckoned to have lasted until the advent of the Third Reich in 1933, though the appointment of Brüning to the chancellory in March 1930 effectively ended the period of democracy; instead came what A.J.P. Taylor, in *The Course of German History* (Hamish Hamilton, London, 1945), called 'demagogic dictatorship'. A primary cause of the change was agitation by the Reichswehr, which sensed that the rearmament programmes were not proceeding fast enough and provoked a crisis.





**6 ABOVE**  
This picture of the post-1918 unrest in Germany, taken in Berlin, typifies the anarchic weaponry of the Freikorps. Visible are five Gew.98, one Kar.98 AZ (fired by the man alongside the armoured-car turret), a Belgian Mle.89 carbine (the man on foot nearest the car), and what appears to be an old 11mm Mauser M.1871 (the man behind the turret). *By courtesy of the Trustees of the Imperial War Museum, negative Q52736.*

Near-anarchy in the early 1920s had caused desperate hardship, and there seemed scarcely a chance that industry generally – much less the specialized arms industry – would ever recover its former glory. A colossal bill for reparations had been presented by the Allies in May 1921, after protracted discussions, but the French re-occupied the Ruhr early in 1923 – in reprisal for non-payment – and the German currency collapsed. As Germany could clearly not continue to meet her debts, important decisions needed taken; gradually, with the assistance of American capital, German economy was rebuilt. This rebuilding could not so much as approach pre-1914 levels; Germany remained cowed.

Privation and weak leadership provided ideal conditions for the development of extremes, just as it had done (and would still do) elsewhere. But the politics triumphant in Germany would be of the far right rather than the Bolshevik left.

## THE ROAD TO REARMAMENT

Even in the 1920s, despite – or perhaps because of – the restriction of the Reichswehr to a mere 100,000 men, the first steps had been taken towards rearmament. There was still much sympathy among the old officer corps for the pre-1918 values, and the sudden reduction of the armed forces from the millions serving the colours in 1918 to a mere 100,000 within two years caused extensive hardship.<sup>1</sup> The advent of old

1. The problematical release of so many men from the military service to which they had become accustomed by several years of war was not unique to Germany; Britain and France, particularly, also found that political unrest was related to levels of unemployment, and that these were often linked directly with the inability of postwar industry to find jobs for millions of disgruntled ex-soldiers who had been promised a New Age.

comrades associations and the first of what would become the paramilitary formations of the Third Reich found a willing audience.

Clandestine operations began in sympathetic countries such as the Netherlands, Denmark and Switzerland, where many 'import/export companies' were formed by arms-makers who had seen their markets wrecked by Allied interference. Rheinmetall, Krupp and Mauser, among others, continued development work covertly – machine-guns were built in Switzerland; submarines, under Krupp supervision, in Finland. But governmental support in 1924 was not what it had been a decade earlier.

An international conference, convened in Locarno, Switzerland, in October 1925, had important repercussions. The most important was that the Weimar government officially recognized its borders with France and Belgium, in addition to the permanent demilitarization of the Rhineland. Signed on 1st December 1925 by the three principals, and guaranteed by Britain and Italy, the treaty lasted until



the Wehrmacht marched into the Rheinland in the Spring of 1936. Whether even the Weimar government ever really considered the terms of Locarno binding is an open question, however; the military most certainly did not.

French ties with the Czechoslovakia and Poland were also ratified in Locarno, as were German arbitration agreements with the same two countries over the unsettled eastern borders; the chances of lasting European peace had never seemed as promising. Interest in the Great War had waned so greatly that the disarmament commissions were withdrawn immediately after the Treaty of Locarno had been signed; the scale of reparations was greatly reduced in 1929; and, in 1930, Allied troops withdrew from the Rheinland five years ahead of schedule. It is no coincidence that the Heereswaffenamt (HWaA, 'army weapons

office') was inaugurated in 1926...immediately the Inter-Allied Control Commission inspectors had been withdrawn! Secret mutual co-operation agreements – signed in Rapallo in 1922 and Berlin four years later – had already been negotiated with the Russians. The German military were paying nothing but lip service to the severe limitations placed on the Reichswehr by the Allies at Versailles. By treating with the Russians, whose politics were diametrically opposed to its own, the German government had shown its true colours.

No sooner had clandestine rearmament begun than the US stock market collapsed, causing the immediate suspension of the second US-backed recovery plan. The Reichswehr-backed appointment of chancellor Brüning in 1930 then suspended parliamentary democracy, and the German economy collapsed once

again; when the German banks closed temporarily in July 1931, six million people were already unemployed. The route to salvation once again lurched toward militarism; and there was a sudden surge of enthusiasm for men such as Hitler who, with no tainted record of governance, could promise to repair national fortunes without the necessity of delivering it immediately. The peace of Europe was already being chipped away; in the Reichstag elections of 1930, the Nationalsozialistische Deutsche-Arbeiterpartei (NSDAP, 'Nazi Party') had been the second largest. The long march to war began to quicken.

Elections held in July 1932 returned more NSDAP candidates than any other, though the party had failed to secure either a majority or even half the votes cast. Initially, president Hindenburg snubbed Hitler, whom he regarded as an



inferior; Hitler had been a corporal in the First World War, Hindenburg was a field-marshal. However, a campaign of political trickery, supported by the thuggery of the rapidly-growing Sturm Abteilung (SA), forced a change of heart. Hitler became Reichskanzler, or state chancellor of a coalition government on the last day of January 1933.

Leadership of restricted proportions was not what Hitler and the NSDAP sought; immediately, the burning of the Reichstag – in highly suspicious circumstances – provided a platform from which to denounce communists and all other left-wing groups. By the Spring of 1933, Hitler had become virtual dictator. To revitalize the flagging German economy, however, massive investment in re-armament was the only effectual substitute for non-existent export markets. In the autumn of 1933, Hitler withdrew from the League of Nations disarmament conference, pleading that Germany could not be expected to remain helpless while the Allies would not themselves disarm.

It was an astute move: excepting France, which vehemently opposed any conciliatory gesture, the remaining Allies – suspicious of France – permitted the Germans to re-arm. None realized the

#### 7 LEFT

'Unsere Reichswehr. Schützengruppe in Deckung'; a postcard produced by Verlag Heinrich Sanders of Bremen in the late 1920s, picturing a 'rifle squad' armed with Kar.98b and an MG.08/15. Note that the rifles have leaf sights, but retain horizontal bolt handles. The card was sent from Schütze Stark of the machine-gun company, Ergänzungs-Bataillon 58, Delmenhorst/Bremen, to his mother on 25 October 1935. Homesick Stark had been conscripted during the enlargement of the Wehrmacht and had spent one whole day in service when the card was despatched! *LPI archives.*

#### 8 ABOVE RIGHT

A Reichswehr-period MG.08 crew practise high-angle anti-aircraft drill – 'Flugzeugbeschuss mit schwerem Maschinengewehr' – in this 'Wehrmacht-Bildserie' postcard dating from c.1928. Mailed by a member of Flak-Ersatz-Abteilung 12, Genesenen-Zug ('convalescents platoon, AA replacement battalion no.12'), it went to Steiermark, Austria, on 24 August 1942. *LPI archives.*

#### 9 RIGHT

Parading the old Imperial Colours in Berlin on Volkstrauertag (National Mourning Day), the first Sunday in November 1932. *LPI archives.*





extent of clandestine development, or believed that Germany could re-equip fast enough to threaten the Allied power-base. All would be proved wrong; Hitler had formed a council for national defence immediately after withdrawing from the League of Nations conference, and such great progress had been made in the development of aircraft, submarines, vehicles and small arms that re-equipment began almost immediately he had left the conference table.

#### 10 LEFT

'Berlin. Die Fahnenkompagnie am Ehrenmal und Zeughaus': men of the German Army (Heer) march their colours down Berlin's Ehrenmal in this postcard published by 'W.St.B.' in pre-war days. Scenes such as these were typical of the early triumphs of Blitzkrieg, excepting that the crowds were greater. *LPI archives.*

#### 11 BELOW

'Berlin. Brandenburger Tor. Die Wache zieht auf'; an honour guard parades through the Brandenburg Gate, Berlin, in the mid 1930s. A postcard published by 'LACO' and sent to München-Grosshadern in March 1939. *LPI archives.*





**12 ABOVE**

The wholesale enlargement of the Wehrmacht after 1935, which involved conscription, brought a huge increase in training schedules. Here men of an unidentified unit, probably photographed c.1937, pose with neatly stacked Kar.98k. *LPI archives.*

Hindenburg's death in August 1934 removed the sole obstacle to Hitler's quest for power. The armed forces, realizing that a return to pre-1918 prominence was virtually guaranteed, immediately consented to Hitler assuming duties of commander-in-chief as well as head of state. Conscription was introduced in March 1935; the Saarland, which had been separated from Germany since 1918, voted to return to the Reich; and the last remnants of the Treaty of Versailles were effectively cast away. Britain, Italy and France were sufficiently alarmed to confer, but Germany had gambled that the principal Allies would be split. Fascist Italy was already gazing covetously at Abyssinia; Britain and France remained unable to reach mutual agreement. In June 1935,

Britain and Germany had even signed a naval agreement in which the former effectively condoned the latter's abrogation of the limitations imposed by Versailles. Civil war loomed in Spain. The gamble had paid.

On 7 March 1936, German troops marched into the demilitarized Rhineland. No more than token Allied reaction had been forthcoming. The commencement of the Spanish Civil War in the summer of 1936 then diverted attention from potential Franco-German confrontation to another theatre, in which rebels led by Franco ('Nationalists') endeavoured to wrest control from the republican government.

The Civil War is best remembered for political events and the affairs of the International Brigade; however, many arms-makers saw it as a heaven-sent testing ground for weapons and equipment. Italo-German aid was speedily forthcoming for the neo-fascist Nationalists; Russia backed the Republicans, but propaganda skilfully obscured the true extent of

foreign aid. Cleverly doctored photographs of American Martins were substituted for Russian Tupolev bombers, and excesses such as the bombing of Guernica by the Condor Legion<sup>2</sup> tended to distract public gaze from the real advances in weapons technology. Though Spain proved to be the drain into which many obsolescent weapons could be sold, it was also the proving ground for Messerschmitt, Dornier, Heinkel and other warplanes that would grace a far greater stage within a few months.

While Spain provided an effective distraction, Hitler attempted to dominate Austria. Here, a vocal right-wing minority was being so effectively orchestrated by the NSDAP that Schussnigg, the Austrian chancellor, had announced a plebiscite. Well aware that this would provide a substantial pro-independence majority, Hitler was forced to act. Austrian resistance was clearly signalled when the

2. The Condor Legion, which formed part of Franco's Nationalist air force, was a test-bed for the Luftwaffe's latest planes. These were generally flown by German pilots, several of whom became aces in the Second World War.





country's president refused to accept pro-NSDAP puppet Artur Seyss-Inquart as chancellor in place of Schuschnigg, who had resigned. At 8.45pm on 11 March 1938, therefore, the order to invade Austria was given; two days later, Seyss-Inquart announced the voluntary incorporation ('Anschluss') of the Austrian state into Greater Germany.

The submission of Austria netted not only substantial portions of the Austrian army, which was immediately assimilated into the Wehrmacht, but also the great arms-making centre of Steyr. Steyr-Daimler-Puch hankered for a return to the halcyon pre-1918 days of its predecessor, Österreichische Waffenfabriks-Gesellschaft, and immediately declared a willingness to work for its new masters. Though Steyr's contributions to the German automotive industry were important, however, its value as a smallarms producer was primarily as a subcontractor for the standard Kar.98k and MG.34, preparation for which began immediately. MP.40 submachine-guns and MG.42 machine-guns were to be made during the Second World War, while small num-

bers of Polish 'Radom' (VIS wz.35) pistols were assembled in the last desperate days of 1945.

The fortunes of Germans in Austria spurred three million inhabitants of western Czechoslovakia (who had been Germans prior to 1918) to demand autonomy. These Sudeten Germans had never settled in artificially created Czechoslovakia, where even Czechs and Slovaks mingled uneasily; encouraged by the NSDAP, they now worked tirelessly in support of their cause. Eventually, in a clear-sighted effort to show Hitlerian depredations for what they truly were, Czech president Beneš agreed to grant each and every Sudeten German demand. If he had hoped for Allied support, he was wrong; meetings between Britain's Neville Chamberlain, France's Daladier and Hitler ended with Anglo-French offer of appeasement. But no sooner had this been accepted by the Czechs than Hitler increased his demands, massing his troops for invasion. The Anglo-French alliance then concurred that the Sudetenland should be occupied by the Wehrmacht with effect from 10 October

### 13 ABOVE

Typifying the considerable economic and military recovery of Germany in the early 1930s, this propaganda picture (probably taken in 1936-7) shows a Heinkel He.60 reconnaissance floatplane above the light cruiser *Köln*, commissioned in 1930. *LPI archives.*

### 14 RIGHT

A member of the Gebirgsjäger (mountain troops), carrying a Kar.98k on his shoulder and snowshoes on his pack, attacks a wintry rock-cleft. From the 'Unsere Wehrmacht' series by Driesen-Verlag of Berlin, this card was sent from Josef Sächler to Maria Hailer in Oberstdorf in July 1943. *LPI archives.*

1938. Czechoslovakia – not even invited to its own funeral – could only accept such strongly-backed terms, while Chamberlain returned to London espousing his belief in 'peace in our time'. The road to war had become precipitous.

On 9 March 1939, embattled Czechoslovakia broke up: Slovakia became independent and, within a week, Hitler had ordered the incorporation of Bohemia and Moravia into Greater Germany. Hungary then annexed parts of Slovakia, and even Poland seized some of the leftover



territory. On 15 March, German troops marched into Prague.

An important result of the Bohemian occupation was the seizure of the arms-making factories, Československá Zbrojovka and Zbrojovka Brno, which were making vast quantities of Mauser-type rifles, together with indigenous pistols and machine-guns. As the standard Czechoslovakian vz.24 service rifle was a near-facsimile of the Kar.98k, little was entailed in reissuing existing guns to German forces or converting the factory to make the regulation German rifle. Most of the machine-guns could also be impressed immediately, as they chambered the German 7.9mm cartridge; however, they had no long-term future and the production line was subsequently converted to make MG.34 Einheitsmaschinengewehre.

With Czechoslovakia dismembered and supine, German attention focussed on Poland. However, though Poland also contained substantial portions of what had once been German territory – large parts of Westpreussen had been detached after the First World War – an important difference existed between the two central European states. Czechoslovakia had been an artificial creation of the League of Nations and had had no chance to develop a national spirit; Poland's periods of independence, however, had created a fierce nationalism. Where the Czechs had capitulated comparatively tamely, the Poles could be expected to resist. In the late Spring of 1939, therefore, Wehrmacht planners were ordered to prepare for the invasion of Poland later in the summer; to clear the way politically, the five year old Germano-Polish non-aggression pact was repudiated and a formal alliance – the 'Pact of Steel' – was signed between Germany and Italy.

Italy informed her one-time Allies, Britain and France, that her troops would side with Germany if the Polish crisis escalated to war. August-long diplomatic shuttling failed to defuse the situation until, finally, Hitler made his move; determined to smash Poland but needing sufficient justification to do so, he approved a plan mooted by the SS for Germans dressed in Polish uniforms to attack the radio station at Gleiwitz.<sup>3</sup> To hoodwink

3. Gleiwitz – close to the pre-1939 Germano-Polish border – is now Gliwice, a few kilometres west-northwest of Katowice



the world, corpses of internment- camp victims dressed in German uniforms would be 'killed' during the raid. The ugly Gleiwitz incident achieved its ultimate goal; at 4.45 in the morning of Friday 1 September 1939, war with Poland commenced.

#### 15 LEFT

This 1940-vintage map shows how Poland was partitioned after the successful Blitzkrieg. Land westward of the broken line running from Ostrołęka in the north to Sianki in the south was German; to the east, Russian.

#### 16 RIGHT

A 3.7cm Flak.18, emplaced on the Germano-Polish border in 1940. Note the three 'kill rings' on the barrel and the range-taker to the left of the gun. *By courtesy of Ian Hogg.*

#### 17 BELOW

'Die Wehrmacht. Gebirgsjäger im Gefecht': a postcard published by Gebr. Metz, Tübingen, in the late 1930s, allegedly showing Kar.98k-armed mountain troops 'in battle' – which lack of equipment and the presence of marker flags in the background make highly improbable! *LPI archives.*



## TO POLAND AND BEYOND

The two German army groups, commanded by Bock in the north and Rundstedt in the south, swept over the borders an hour after the Luftwaffe had softened Polish defences with precision dive-bombing. The Polish airforce responded valiantly, but its antiquated warplanes

were no match for the German Messerschmitts, Dorniers and Heinkels. Crucially relying on the vapid promises of support from the Western Allies, the Polish high command had formed its primary defensive line westward of the diagonal formed by the river Vistula and its principal tributary, the San. But the open nature of the Polish Plain, despite a dearth of good roads and occasionally impassable sandy tracts, allowed the

numerically insignificant German mechanized divisions to outflank the Poles, then turn to prevent the latter from falling back on their prepared defences. Cut off by Germans in front and behind, then separated into small pockets by intelligent thrusts, the Polish forces had little option but to capitulate. A general retreat was ordered on 10 September; by 5 October, the last sizable remnants of the Polish army had surrendered. Franco-British thrusts anticipated in the West, in support of Poland, had failed to materialize.

France and Britain had actually declared war against Germany on 3 September 1939, but the rapid demise of Poland – and their own unpreparedness – resulted in Western Allied inaction. Hitler proposed peace on 6 October provided the seizure of Poland was approved, but the terms could not be accepted by either Britain or France if credibility was to be retained. Vacillation and bad weather prevented an escalation of hostilities in the west until after the 'Phoney War' of 1940. Then Norway and Denmark were overrun and conquered by the audacious Operation 'Weserübung', beginning on 9 April 1940, and the upward spiral began. British troops were landed in a forlorn attempt to isolate Ger-



man troops in northern Norway from stronger contingents in the south, but the well-trained Gebirgsjäger – reinforced by Kriegsmarine personnel in an infantry role – proved superior to British units. The cream of the British Army, after all, remained with the British Expeditionary Force ('BEF') in France. Unable to make headway, the last British troops withdrew on 4/5 June 1940 and the Norwegian authorities formally surrendered on 9 June. Operation 'Weserübung' had cost the Germans a little over five thousand men, many with the cruiser *Blücher* in Oslofjord. But while the Norwegian campaign gained the Kriegsmarine valuable naval bases on the West Atlantic coast, it contributed little directly to the Wehrmacht's smallarms arsenal.

#### 18 RIGHT

Taken during the Polish campaign in 1940, this picture shows a machine-gun team armed with an MG.34 carried by the farthest soldier. The middle man appears to have the ammunition supplies, apart from the short belt dangling from the gun. LPI archives.

## WAR IN THE WEST

War came to Belgium, the Netherlands and Luxembourg in the morning of 10 May 1940. Commanded by Bock, the northern German army group soon overran the Netherlands by a combination of daring paratroop attacks, terror bombing and sheer weight of numbers. The Royal Dutch Army surrendered on 14 May, having lost a quarter of its strength in four days; Belgium sought an armistice on 26 May, despite the brave resistance of its army. France was also caught by surprise as the German southern army group, commanded by Rundstedt, surged out of the Ardennes rather than – as had been wrongly anticipated – through more northerly parts of Belgium. By outflanking the Maginot Line and pitting experienced men against weaker French units, the Wehrmacht made great gains. By 20 May, and despite being temporarily removed from command for chancing too much, Guderian had arrived at the Channel Coast. Almost the entire BEF and substantial portions of the French army had been enveloped in a gigantic pincer that threatened to push them back into the sea.



The fall of Calais on 26 May persuaded the British Commander-in-Chief, Gort, to order the commencement of Operation 'Dynamo' – evacuation from the channel ports. The miracle of Dunkirk, completed on 4 June 1940, saw the rescue of more than 330,000 British and French troops at minimal cost, but virtually all their equipment had been lost and thousands of French troops to the south had been unable to gain safety. The French military blamed the 'cowardly' British to gloss over an inability to mount a concerted riposte to the invasion. Unfortunately, severe damage had been done to Anglo-French relations and French enthusiasm

for war weakened perceptibly. The French government fled from Paris to Bordeaux on 12 June, Premier Reynaud resigned four days later and his successor, Pétain, immediately requested an armistice. On 22 June 1940, the French government accepted swingeing German terms at Compiègne: ironically, in the same railway carriage in which German representatives had signed the armistice in 1918.

The capitulation of the Netherlands, Belgium and France provided a considerable haul of weapons. As far as smallarms were concerned, however, there was little to offer other than the production facili-

ties of Fabrique Nationale d'Armes de Guerre in Herstal-lès-Liège in Belgium, where, in 'DWM Werk Lüttich', many hundreds of thousands of pistols and rifle components were made until September 1944. The Netherlands had only the comparatively small-scale Hembrug factory; and though the French government had appreciable manufacturing capacity, the standard smallarms were unacceptable. Procurement was subsequently limited to handguns, particularly from commercial operations in Bayonne and Hendaye, though small numbers of rifles were taken back to Germany for the police. Large numbers of Mle.24/29 ('Châtellerault') and Mle.31 machine-guns were eventually emplaced in the Atlantic Wall fortifications, but the necessity to arm the pro-German Vichy forces restricted supplies to the Wehrmacht.

The unexpectedly speedy collapse of Western Europe created a myth of German supremacy, a panacea for the consciences of ineffectual governments and high-ranking soldiers whose grasp of tactics was still deeply rooted in Verdun and the Somme. As Captain Sir Basil Liddell Hart observed in *History of the Second World War* (Cassell, 1970):

'The dazzling effect of what the new elements achieved has obscured not only their relatively small scale but the narrow margin by which success was gained. Their success could easily have been prevented but for the opportunities presented to them by Allied blunders – blunders that were largely due to the prevalence of out-of-date ideas. Even as it was, ... the success of the invasion [of France] turned on a lucky series of long-odds chances ...'

In spite of the conservative Wehrmacht leadership, which was only one step re-

moved from the trenchscape of the First World War, the achievements of visionaries such as Guderian and Student – leading the Panzers' drive to the coast and the parachutists' attacks in the Low Countries respectively – brought success against the odds. The French had bigger and better tanks than the Germans, available in greater quantity, and would have outnumbered the invaders had mobilization been efficient. But military intelligence had failed to detect the strength of the mechanized attack through the 'impassable' Ardennes, where cavalry had been despatched to meet tanks; the Franco-British armies had massed in the wrong place; and the vaunted Maginot Line had simply been outflanked. French mobilization was too cumbersome; by the due date of its completion, the Germans had already gained an unbeatable hand.



#### 19 LEFT

Walther Frank, governor of German-occupied Poland, takes the salute on the first anniversary of the inauguration of the Government-General, 26 October 1940.

The experiences in western Europe in 1940 had practically no effect on the development of German smallarms. With the fall of France, attention switched to the air war on Britain, and attempts to close the sea lanes by U-boat warfare. Not until the invasion of Russia in 1941 would the performance of the German smallarms – and the ability of industry to maintain supplies in the face of unexpectedly high losses – come under scrutiny.

## THE INVASION OF RUSSIA

A little after three o'clock in the pre-dawn greyness of Sunday 22 June 1941, six thousand German guns opened fire. When the barrage lifted, three army groups surged over the borders separating European Russia from East Prussia and German-occupied Poland. Operation 'Barbarossa' – the invasion of Russia – had begun.

Smashing the Balkans to secure the southern front, allowing a Romanian army to enter the Ukraine by way of Besarabia, had taken time; more import-

antly, an unexpectedly protracted spring thaw had delayed the assault. Now Army Group North sped northward: its goals were Leningrad, the Baltic and a link with the Finns. Army Group Centre, given the major role, was to envelop Russian defences in a pincer movement, then rush for Minsk and Smolensk to encircle large sections of the Red Army. Army Group South was to drive from southern Poland to Kiev, seize the grain-rich Ukraine and then take the vital industrial basin of the Donets river.

Initially, the army command wished to push on though Group Centre and take Moscow, destroying the Communist Party hierarchy and the principal centre of

communications. Unlike his generals, however, Hitler was obsessed with securing the Baltic states. Here he rightly foresaw that anti-Russian feeling could be exploited; but, as he also wished to seize the important agricultural and industrial regions in the south, the seeds of later discontent had been sewn.

## EARLY TRIUMPH

The Germans enjoyed immediate success. The Russians had been caught totally unprepared; indeed, the first reports of the invasion were dismissed in Moscow simply as rumours or scare-mongering. Massing of German troops on the Russo-German border had been noted, but nothing had been done to prepare defences. Not until four hours after the invasion had begun did the Russians authorize limited retaliation. By the time the messages were despatched, many

addressees were long dead. Russian troops sometimes rallied and fought to the death; but though slowed temporarily, particularly in the Ukraine, the Germans rolled on. At the end of the first week in July, Army Group South was less than a hundred kilometers from Kiev, the Ukrainian capital; in the middle of August, a trap had been sprung around twenty Russian divisions near Uman and more than 100,000 prisoners taken. By August, the Red Army, withdrawing to the east bank of the Dnieper, had abandoned the garrisons of Kiev and Odessa to their fates.

On 15 July, Guderian's Group Centre Panzers had reached Smolensk while Hoth, after taking Minsk on 26 June, stood at Vitebsk in the north. The Smolensk pocket was completely encircled the following day, forcing two Russian armies and countless smaller units – nearly 140,000 men – to capitulate. Group North had penetrated 250km inside Russia by 26 June, just four days after the invasion had

### 20 BELOW

Taken on 26 June 1941, four days after the start of Operation 'Barbarossa', this purports to show a light machine-gun crew helping to clear a Russian village. Note the MG.34 on its bipod (Zweibein 34), the MP.38, and a P.08 holster being worn by the gunner. Three SG.84/98 bayonet scabbards are also visible. *LPI archives.*







could not give the Germans numerical superiority.

However, the Luftwaffe obliterated the Russian airforce in the invasion zone and denied the Red Army air cover. The prodigious Russian losses of men and matériel to German advances soon tipped the balance; by the middle of July, therefore, the Wehrmacht and its allies had achieved even a numerical advantage.

The failure of the Red Army depended as greatly on self-inflicted wounds as the German performance. Despite pre-war fears that the wholesale enlargement of the German army had left no time for proper training, combat experience in Poland, the Western Front and the Balkans had turned raw recruits into seasoned veterans. From the humblest private virtually to the top of the military hierarchy, the Red Army could offer little by comparison: during the purges of 1937-8, three of the five marshals, thirteen of fifteen corps commanders and more than half the brigade commanders had been arrested, were murdered, had 'committed suicide' or simply disappeared.

As all but five members of the 80-strong Supreme Military Council had

#### 21 LEFT

Members of an infantry squad pose for the camera on a pleasant summer day in occupied Russia, 1941. The end men have Kar.98k with SG.84/98 fitted, while the man in the right middle holds an MP.38 or MP.40. One soldier has the pouch for the submachine-gun magazines, while two men carry despatch cases. *LPI archives.*

begun. Dvinsk fell; Leningrad appeared to be there for the taking.

By the end of August, the Germans were ascendant; the Russians had lost unbelievable numbers of men to death, incapacitation or capture. Army Group North had pushed up through Dvinsk towards Leningrad, where it was being held at a makeshift Russian defensive line running through Luga. Group Centre's advance had taken it to little more than 300km from Moscow. Group South occupied much of the Ukraine, and was ready to sweep over the Dnieper into the industrialized heartland of European Russia. The German commanders sensed victory; the road to Moscow, they implored Hitler, lay open. But Hitler wanted Leningrad instead. Ultimate victory had gone

## RED RETREAT

The overwhelming of the Red Army, so large and ostensibly properly equipped, was due to the sheer weight of the surprise attack and political interference that counselled attack instead of concerted defence. The Germans had invaded Russia with 135 infantry and nineteen Panzer divisions, two motorized brigades and a motorized regiment; against these, the Russians should have been able to muster 197 divisions, but few were at full strength. The forces were fairly evenly balanced, as even the addition of Romanian, Italian and Slovakian troops – of somewhat doubtful quality –

been imprisoned, together with the entire Vice-Commissariat of Defence, results were predictable. New commanders were acceptable politically, but lacked combat experience and adhered strictly to Stalinist dogma. The Red Army could only suffer until survivors of the purges could be 'rehabilitated' from exile or the labour camps.

As the 1917 revolution had severed the links with France, no western assistance had been forthcoming until the late 1920s. Then Germany, hell-bent on developing a clandestine arms industry, began to court Russian assistance. But the Germans were willing to co-operate only to suit their own needs. Many of their greatest advances remained hidden from the Russians; production of others often



proved more than the Russian industry could handle.

By the late 1930s, Russian industry was producing vast numbers of tanks, aircraft and smallarms. The Red Army ranked among the largest in the world; qualitatively, however, its deficiencies were clear. The Germans soon proved the pointlessness of thousands of slow, cumbersome and weakly armed aircraft; Panzers and anti-tank guns annihilated delicate medium tanks, under-armoured tankettes or impossibly cumbersome super-tanks alike; and Russian rifle divisions were simply hordes of riflemen rather than the sophisticated mixture of rifles, automatic and support weapons that characterized Wehrmacht equivalents.<sup>4</sup>

4. As more than one Russian commander remarked, 'a rifle is a rifle' and the concentration of such weapons permitted commanders to develop a particular form of warfare; this they did with increasing skill, and the manipulation of a rifle required no sophisticated training. When the strength of the division fell, through combat or natural wastage, new riflemen could be provided from the vast Russian manpower reserve with a minimum of delay. Gradually, this doctrine began to overhaul the more technically-based German approach.

## THE WEAPONS OF BARBAROSSA

There was little to choose between the standard German infantry rifle, the Kar.98k, and its Russian equivalent. The obr.1891/30g Mosin-Nagant – known to the Germans as the Gewehr 254(r) – was a little longer and cruder, but had much the same performance. The Kar.98k was the better-made prior to 1942, but production quality declined after the substitution of a *Kriegsmode*ll ('war[-quality] model') and the guns made in 1945 were very poorly finished. After the initial dislocation of production, the quality of the Mosin-Nagant metallurgy, if not its finish, began to increase as the war ran its course.

Paradoxically, the Russians had made more progress with semi-automatic rifles and had issued hundreds of thousands of SVT (Tokarev) rifles even as the Germans

### 22 ABOVE LEFT

German infantrymen, armed with Kar.98k, take advantage of the cover afforded by a ditch 'somewhere in Russia' before emerging onto the gunfire-swept road. From the photo-postcard series 'Infanterie greift an', published by Erich Gutjahr Bildverlag, Berlin, c.1941; *LPI archives*.

### 23 ABOVE RIGHT

'Das alles sind Infanteriewaffen': a photocard published by Erich Gutjahr, Berlin, shortly after the invasion of Russia in the summer of 1941. Here a Grenadier searches the burning ruins of a railway station for enemy stragglers. The position of the cocking piece shows that his Kar.98k is ready to fire. *LPI archives*.

experimented with the ineffectual Gew.41. But the rapid loss of production facilities in the opening stages of Barbarossa, and a vital need to make vast numbers of simple guns, restricted SVT production in favour of the Mosin-Nagant.<sup>5</sup> The jam-prone Tokarev was too

5. Whether the SVT was ever considered for universal issue is moot, as it seems to have been confined to NCOs, snipers and elite units such as the Russian Marines.



complicated for the average Russian soldier's grasp of preventative maintenance; however, in the hands of the better-trained Wehrmacht personnel, the gas-

#### 24 RIGHT

A map case-carrying Wehrmacht soldier tries to master the intricacies of the 12.7mm DShK heavy machine-gun – a powerful weapon that was very popular with the Germans when it could be turned against its former owners. This gun has an unusual shielded mount, regularly associated with the rifle-calibre Maxims but rarely with the DShK. *Author's archives.*

#### 25 BELOW

Pictured in Russia during the battle for Stalingrad, when no longer ascendant, this motley collection of Wehrmacht personnel has an equally motley collection of weapons. The man in the left foreground carries an ex-Russian SVT 40 (Tokarev) semi-automatic rifle, while the cigarette-clasping Unteroffizier on the right is wearing a holster for the ex-Czech Pistole 27(t). *By courtesy of the Trustees of the Imperial War Museum; negative no. HU5149.*



operated SVT (Selbstladegewehr 259[r]) was much more popular than the 'perfected' Gew.41.

The German MP.38 and MP.40 ('Schmeisser') submachine-guns were not only technically superior to the Russian PPD or MP.715(r), rarely seen in June 1941, but were also available in far greater numbers. Mass-production of the PPSH (MP.716[r]), with a 71-round drum magazine beloved of even the Germans, did not begin until the Spring of 1942; when it did, however, deliveries soon far outstripped the ability of the German gunmaking industry to compete. Many German units quickly seized on the PPSH, particularly for re-issue to officers and senior NCOs who carried nothing more effectual than a Parabellum or Walther pistol.

The invaders' machine-guns represented a considerable technological lead over their Russian equivalents. But it may be debated whether the belt-fed MG.34 was a better light machine-gun under Russian conditions than the DP. The German gun was undoubtedly superbly made and could be adapted to a variety of mounts to provide a medium-support weapon, but this flexibility

placed an increasing strain on supply lines. Manufacturing tolerances were too fine to cope with either the Russian winter or the arid semi-desert of the south. The MG.34 was simply too well-made for its own good.

The lightweight pan-fed DP (le MG.120[r]) was a true infantry weapon, designed for only a specific role but very easy to use. Persistent magazine jams and a badly-placed mainspring contributed to the DP's problems, as did the broad metal-to-metal contact surfaces in the dusty Russian summer, but it was otherwise acceptably reliable.

Neither side had modern heavy support machine-guns. The Russians had the old Pulemet Maxima, or obr.1910g (PM, s MG.216[r]), a Maxim-system gun comparable with the German MG.08. Water-cooled Maxims were solid, efficient and capable of sustaining fire for long periods, but heavy, awkward and obsolescent. The mobility of the wheeled Sokolov mount, however, conferred several advantages over the static German Schlitten 08 and MG-Lafette.

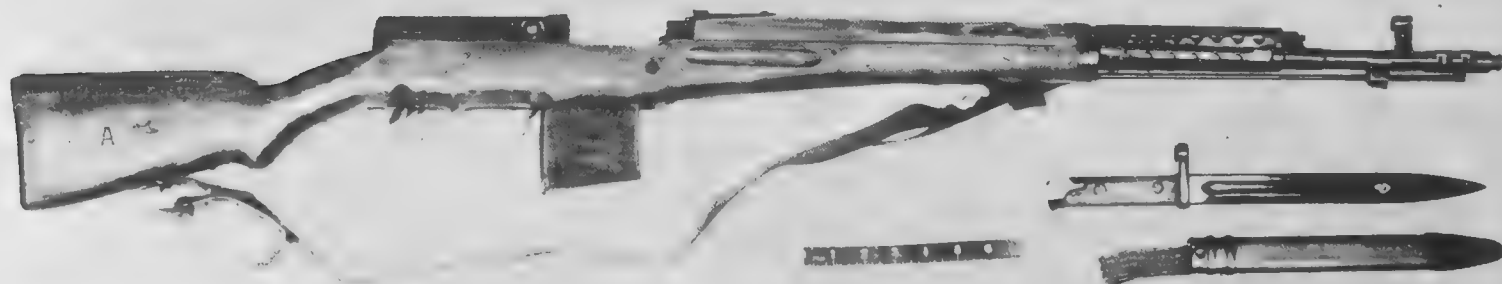
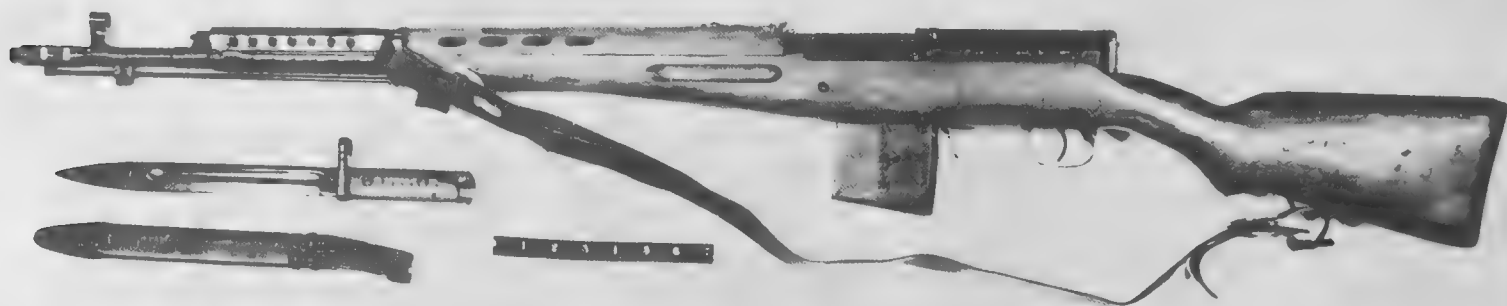
By 1941, neither of the modern Russian machine-guns, the 7.62mm DS (s

MG.218[r]) and the 12.7mm DShK had been developed satisfactorily. Indeed, the DS was subsequently abandoned entirely and manufacturing problems with the otherwise effectual DShK persisted into the postwar era. Oddly, the Germans never bothered with infantry machine-guns comparable to the .50 Browning or the DShK, preferring a perfected general-purpose machine-gun (the MG.42) to supplement the MG.34.

The field-gun type anti-tank weapons of the protagonists were comparable, though neither army had a particularly efficient anti-tank rifle in June 1941. The Germans had issued a few 7.9mm PzB.38 and PzB.39, plus some awesome 20mm Steyr-Solothurn, cannon on shoulder mounts, but ever-increasing thickness of tank armour soon made such rifles valueless. The Russians, after making a few

#### 26, 27 BELOW

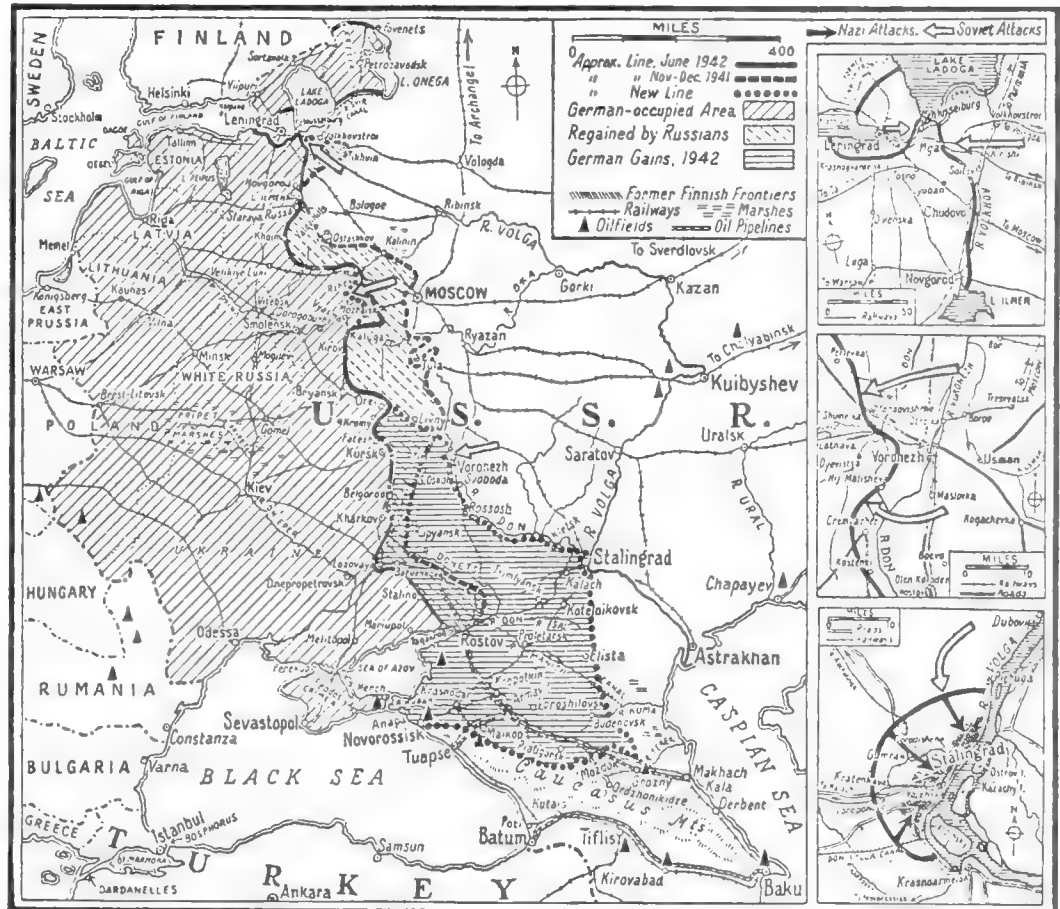
The gas-operated Russian SVT40 (Tokarev) semi-automatic rifle was popular with the German troops who, in the immediate post-'Barbarossa' period, had nothing comparable. The upper picture shows the breech open, held by the magazine follower; the lower illustration shows the breech closed and locked. *Author's archives.*



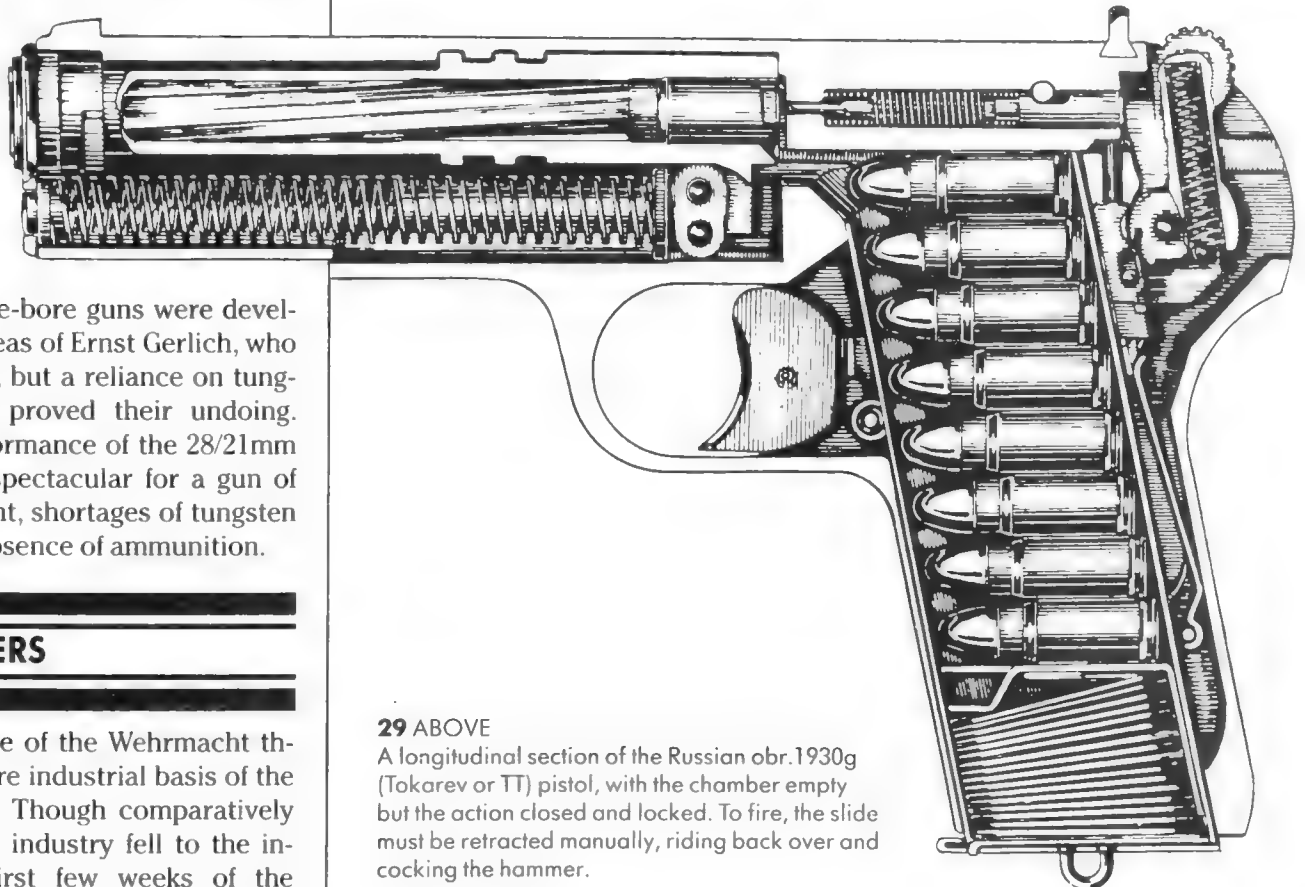
modified copies of the Mauser T-Gewehr and then standardizing the semi-automatic PTR in the autumn of 1939, discovered that that neither was effectual. In desperation, they developed the 14.5mm-calibre PTRD and PTRS concurrently; though the guns were ineffectual against the frontal armour of the German medium tanks, Russian gunners were taught to shoot at the thinly armoured flanks, undersides or rear of the German Panzers. Fuel tanks, engine air intakes, gun-sights and visors were also favourite targets. As a bonus, the PTRD and PTRS were very useful against armoured cars, half-tracks and soft-skinned vehicles; unlike their German equivalents, they served until the end of the war.

## 28 RIGHT

Originally published in the magazine *Free Europe*, this shows the extent of the Russian recovery after counter-offensives against the Germans up to June 1942 – and how, notably in the south, the Wehrmacht then pushed the boundaries eastward again later in 1942.



The Germans, typically, sought more sophisticated solutions to the anti-tank



## 29 ABOVE

A longitudinal section of the Russian obr.1930g (Tokarev or TT) pistol, with the chamber empty but the action closed and locked. To fire, the slide must be retracted manually, riding back over and cocking the hammer.

## RUSSIA TOTTERS

The swift advance of the Wehrmacht threatened the entire industrial basis of the USSR's economy. Though comparatively little of the arms industry fell to the invaders in the first few weeks of the campaign, towns such as Tula, Kalinin, Kharkov, Kursk, Orel and Stalingrad were



Der 1. SS-Panzer-Division kehrt nach erfülltem Auftrag mit seinen Gefolgsmännern zurück.

soon all threatened. Tula held out; as did Stalingrad, but only after being reduced to smoking rubble. In desperation, the Russians evacuated whole factories and entrained them eastward piece by piece. And though this was greatly assisted by the industry's crude nature, it was also one of the greatest organizational feats of modern times. By sheer determination and an acceptance of impossible hardship, workers gradually rebuilt the factories hundreds of miles from their original sites and – slowly, laboriously – war production began again.

The winter of 1941-2, as severe as any Russian could have expected, greatly restricted the German advance. Germany had staked everything on Blitzkrieg. In a Russian winter, Blitzkrieg may fail. Guns jammed; lubricants froze; the Luftwaffe could not take to the air when most needed. Even the Panzers' comparatively narrow tracks were at a disadvantage to the wide Russian patterns, which reduced ground loading appreciably.

The period of comparative inactivity allowed the Russian industries to recover the strength vital to meet German challenge renewed in the Spring. The Red Army even counter-attacked in December





**30 LEFT**

'Infanterie kennt keine Hindernisse' ('infantry knows no obstacles'); a photocard published by Erich Gutjahr, Berlin, shortly after the invasion of Russia in June 1941. Assault grenadiers are shown 'having fulfilled their orders, bringing back captured prisoners of war'. The soldier nearest the camera is wearing a P.08 holster, while the man behind him has the MG.34 tripod. The gun is being carried by the soldier immediately in front of the Russian prisoners. *LPI archives.*

**31 BELOW LEFT**

Wehrmacht machine-gunners man an MG.34 on MG-Lafette 34, somewhere in Russia during the winter of 1941-2. *By courtesy of Ian Hogg.*

**32 RIGHT**

Two officers and a newly-decorated NCO (centre) pose for the camera, probably in Russia in the summer of 1941. Note that one man wears a P.08 holster, recognisable by its diagonal strap-and-buckle closure. *LPI archives.*



1941, when the index of industrial production had fallen to its all-time low. Caught unprepared in more than one zone, the Germans soon rallied; yet damage had been done for, despite predictably disastrous casualties, the Red Army had managed to halt the Wehrmacht for the winter. Flagging Russian morale recovered sufficiently to stop the precipitate removal of industry eastwards.

The summer of 1942 brought another German thrust, Operation 'Blau', seeking to take land west of Stalingrad with a pincer movement and then seize the city itself. Its opening stages coincided with a poorly planned Russian counter-offensive optimistically intended to raise the investment of Leningrad, reconquer the Crimea and re-take Kharkov. The Germans, from the stronger position, dispersed the Russian threat. However, time had been lost and the winter of 1942 brought a Red Army offensive that smashed its way through the Romanian and Italian units, encircling the German Sixth Army in Stalingrad.

Göring had boasted that the Luftwaffe could supply the besieged Sixth Army just as it had done earlier at Demyansk and Khelm. Winter weather and renewed Russian air presence mocked his words. Fifty thousand men, many sick or injured, were air-lifted out of Stalingrad, but more than a hundred thousand men (including Generalfeldmarschall Paulus and more

than twenty generals) capitulated on 31 January 1943. For 75,000 more, Stalingrad was a mass grave. The myth of Teutonic invincibility had been irreparably shattered and, after the awesome battle of Kursk in July 1943, the course of the war was no longer a matter of who would win but rather when the Russians would reach Berlin.

## 1943: END OF THE BEGINNING

The battle of Kursk, a titanic confrontation of armour and air power, was a turning point in the war on the Eastern Front. 2,600 German and 3,300 Russian tanks and assault guns battered away remorselessly, while as many as four thousand aircraft wrestled for supremacy overhead. The casualty figures were also on an heroic scale; virtually half of the armoured vehicles were knocked out. And though the balance of casualties favoured the Germans, whose tanks, self-propelled guns and anti-tank artillery were usually handled with greater discipline, the losses were too grand for hard-pressed German industry to repair. The Russian initiative marked a perceptible change in the course of the war.

By the summer of 1943, Russian industry was able to outstrip not only the ability of the Red Army to lose matériel, but also German industry's capacity to re-

supply the Wehrmacht. Output of tanks, particularly, reached prodigious heights. What the Russian weapons lacked in quality – which was often considerable – was more than offset by quantity.

By 1943, the Russian smallarms industry, having regained much of its pre-1941 footing, was producing many millions of weapons per annum. Though these included obsolescent Mosin-Nagant rifles, Maxim and Degtyarev machine-guns, sufficient time had been bought to resurrect re-equipment plans mooted prior to Operation 'Barbarossa'. The rise of the submachine-gun had encouraged the concept of tank-borne infantrymen and though the PPSH remained in production until the end of the war, the simpler PPS was increasingly preferred while the Germans were desperately seeking an effectual autoloading rifle: the Gew.41, adopted in December 1942, was clearly destined to fail. And though it was to lead directly to the highly successful Gew.43, interest had switched to the promising full-power Fallschirmjärgewehr (FG.42) and the first experimental Maschinenkarabiner.

Both sides had new medium-support weapons. The Wehrmacht had the impressive MG.42, characterized by a fire-rate so high that it gained the sobriquet *Hitlersäge* ('Hitler's Saw'). The MG.42 was the outcome of simplified machine-gun trials that had begun almost as soon as the MG.34 had been approved. Some ex-

perts had realized that the MG.34 was much too complicated to mass-produce, but simplicity was favoured by neither the HWaA nor the gunmakers. The latter viewed metal-stamping, pressing and precision casting with particular distaste.

The HWaA was eventually persuaded by simplicity; and a competition announced in 1939 had produced an efficient recoil-operated experimental gun made by Grossfuss of Döbeln to the designs of Grüner. The MG.42 was finally adopted in the summer of 1942, but only 17,250 had been made by the end of the year. The gun was often fired from its integral bipod (Zweibein 42), but could be transferred to a sophisticated buffered quadropod to provide support fire.

The Russian equivalent of the MG.42 was the Goryunov machine-gun, the first prototypes of which appeared just as mass-production of the MG.42 commenced. The SG-43 was a sturdy, reliable and effectual belt-fed medium machine-gun, intended to replace the Maxim, and could be mounted either on a tripod or a Sokolov-inspired wheeled carriage. Comparatively few SG were used by the Wehrmacht; by the time they reached service, the Germans were no longer ascendant, and far smaller amounts of war matériel was being captured than in the heady opening campaigns of Barbarossa.

The tide of battle had also begun to turn elsewhere. British successes in North Africa – particularly immediately after El Alamein – began to tell on the Afrika Korps. The rupture of the Mareth line at the end of March 1943 was followed by near-rout of the Axis forces; and on 12 May, the German commander, Jürgen Sixt von Arnim, surrendered with approximately 290,000 men. The stage had been cleared for Operation 'Husky', the invasion of Sicily on 10 June 1943 by the US 7th and British 8th Armies. Events in Italy were precipitate: the Sicilian capital, Palermo, fell to US troops on 22 July; Mussolini was forced out of office on 25 July and the Italian fascist party was dissolved the following day. Italian armed forces surrendered on 8 September 1943, the day before the US 5th Army under Mark Clark landed at Salerno and the British 1st Airborne Division landed at Taranto. The general northward advance through Italy then led to an armistice, signed on 29 September, and Italy de-



clared war on her one-time ally Germany on 13 October.

In the north of the country, however, the Germans determined to resist. Overseen by Luftwaffe Generalfeldmarschall Kesselring, who proved a wily commander, a counter-attack was mounted on the Allies in February 1944. A long, slow slog northwards ensued; the monastery at Cassino, which fell to Polish

troops in May, became a symbol of German resistance. Not until August did the 8th Army reach Florence.

The Italian campaigns had practically no effect on Wehrmacht smallarms, excepting that, in addition to unusually large numbers of Beretta Mo.938A submachine-guns (MP.739[i]), the Germans obtained Beretta pistols, FNAB submachine-guns, and even some Mo.938 rifles

modified for the standard 7.9mm rifle cartridge.<sup>6</sup>

## 1944: BEGINNING OF THE END

Continual probing along the German lines on the Eastern Front revealed a weakness through which Russian forces cleared most of the Ukraine during 1943. In addition, Hitler's insistence on 'hedgehogs'<sup>7</sup> – against his generals' penchant for less restrictive linear defences – enabled the Russians to bypass the strongpoints and then mop them up at leisure. The system

the Wehrmacht had also been forced to cover the withdrawal of Italy from the war, while preventing Anglo-American advance up the Italian promontory into Vichy France and on into Austria, the efficacy of the German campaign in Russia was seriously compromised.

The most important diversion had been the opening of the 'Second Front', the mass invasion of Europe by Anglo-American forces – D-Day, 6 June 1944. The Allies, landing unexpectedly in Normandy, rather than the Pas de Calais, soon consolidated their bridgeheads and broke out. By 29 June Cherbourg had been liberated; on 9 July, the British

reached Caen; Rennes fell to the US 3rd Army on 4 August (the day Florence had fallen to the 8th Army in Italy); and the Seine had been gained by 20 August. By 11 September, most of France, Belgium and the Netherlands had been liberated, and the first US Army patrols had crossed into German territory. Despite the debacle at Arnhem; a vigorous German counter-attack aimed at regaining Nijmegen; and the so-called 'Battle of the Bulge' against US forces in the Ardennes (16 December 1944–28 January 1945), the Allied advance on Germany rolled on.

After a wholesale reorganization of their resources on the Eastern Front, the

### 33 LEFT

Kar.98k-carrying Wehrmacht troops advance in single file along a rural pathway in Russia, summer 1941. From an anonymous 'Unsere Wehrmacht' postcard. *LPI archives.*

### 34 RIGHT

Sprinting from his bunker, a Volksgrenadier carries a Gew.43 – made in substantial numbers, but rarely photographed in action. His companion has a large, slab-slide pistol: possibly a Browning GP, or perhaps a Polish Radom. Taken in Eastern Poland on 14 November 1944. *LPI archives.*

was not unlike that employed by the Germans in the opening stages of Operation 'Barbarossa'.

Throughout the winter of 1943-4, and on into the summer of 1944, the Red Army made inroads into what had been Russian territory prior to June 1941, catching the Germans where they were weakest. Forced to defend a lengthy boundary with insufficient men, the Germans could do little but fall back. Once the Red Army had raised the siege of Leningrad on 27 January 1944, pressure was easily brought on the Finns to sue for peace; in the south, diplomatic moves, with promise of territory claimed by Hungary, caused Romania to question its motives for war. Eventually, a coup d'état on 23 August 1944 overthrew Antonescu, the Romanian dictator, and an surrender was immediately concluded with Russia. As



6. The modified Italian rifles may be identified by a large 'S' struck into the breech above the chamber. Owing to the combination of poor-quality steel and a more powerful cartridge than they were designed to accept, 7.9mm Italian Mannlicher-Carcanos should never be fired.

7. Powerful defensive formations centred on a town or suitable geographical centre.

**35 LEFT**

German equipment was popular with partisans in virtually all of occupied Europe. Here Mlle Simone Segouin, a member of the FTFF fighting alongside the Maquis, awaits the arrival of Général de Gaulle in Chartres, 26 August 1944. Note that Mlle Segouin holds an MP.40 and has a small automatic tucked into her waistband; her commander shoulders a Kar.98k and has a P.38 holster on his belt. *By courtesy of the Trustees of the Imperial War Museum; negative no. BU17.*

**36 ABOVE RIGHT**

The Versuchs-Gerät 1-5 (or 'Volkssturmgewehr') was an interesting gas-impingement type of delayed blowback, developed by Barnitzske of Suhl and made in small numbers for the local defence of Thüringen at a time when manufacturing standards were declining irreversibly. *By courtesy of Ian Hogg.*

**37 BELOW**

Two US soldiers demonstrate an emergency conversion of the 2cm Flak.38 on a wheeled 'Volkssturm' mount. *US Army official; by courtesy of the US Army Signal Corps.*

Russians had prepared Operation 'Bagration', an attack by the three White Russian Fronts and the First Baltic Front on German Army Group Centre. So many of the German units were under-strength that the Red Army could field four soldiers for each German; and six tanks to every Panzer.

'Bagration' was set for 22 June 1944, the third anniversary of the German invasion. Though the German commander of Group Centre foresaw the attack, his request to effect a strategic withdrawal fell on deaf ears; instead of the twenty-kilometre retreat recommended by Guderian, Hitler and Model would grant but three.

The result was a disaster for Germany. The massive Allied invasion through Normandy had forced the Wehrmacht to fight on two fronts rather than one, stretching resources to their limit, while the defection of Romania and then Bulgaria to the Allied cause brought the collapse of the Balkan theatre. Soon, the Red Army massed on the pre-war border with







Poland. With merely 75 divisions, the Wehrmacht was to attempt to hold 1,100km against troops outnumbering them at least ten to one. Such had been the Russian industrial recovery that there were seven tanks for every Panzer; twenty Russian field-guns for each German one; and perhaps twenty Russian aircraft for each fighter the Luftwaffe could put into the air. Qualitatively, the Germans still held an important edge, but technical superiority had been frittered away uselessly; quantitatively, the Russians now had a vast superiority in men, matériel and, perhaps, the will to win.

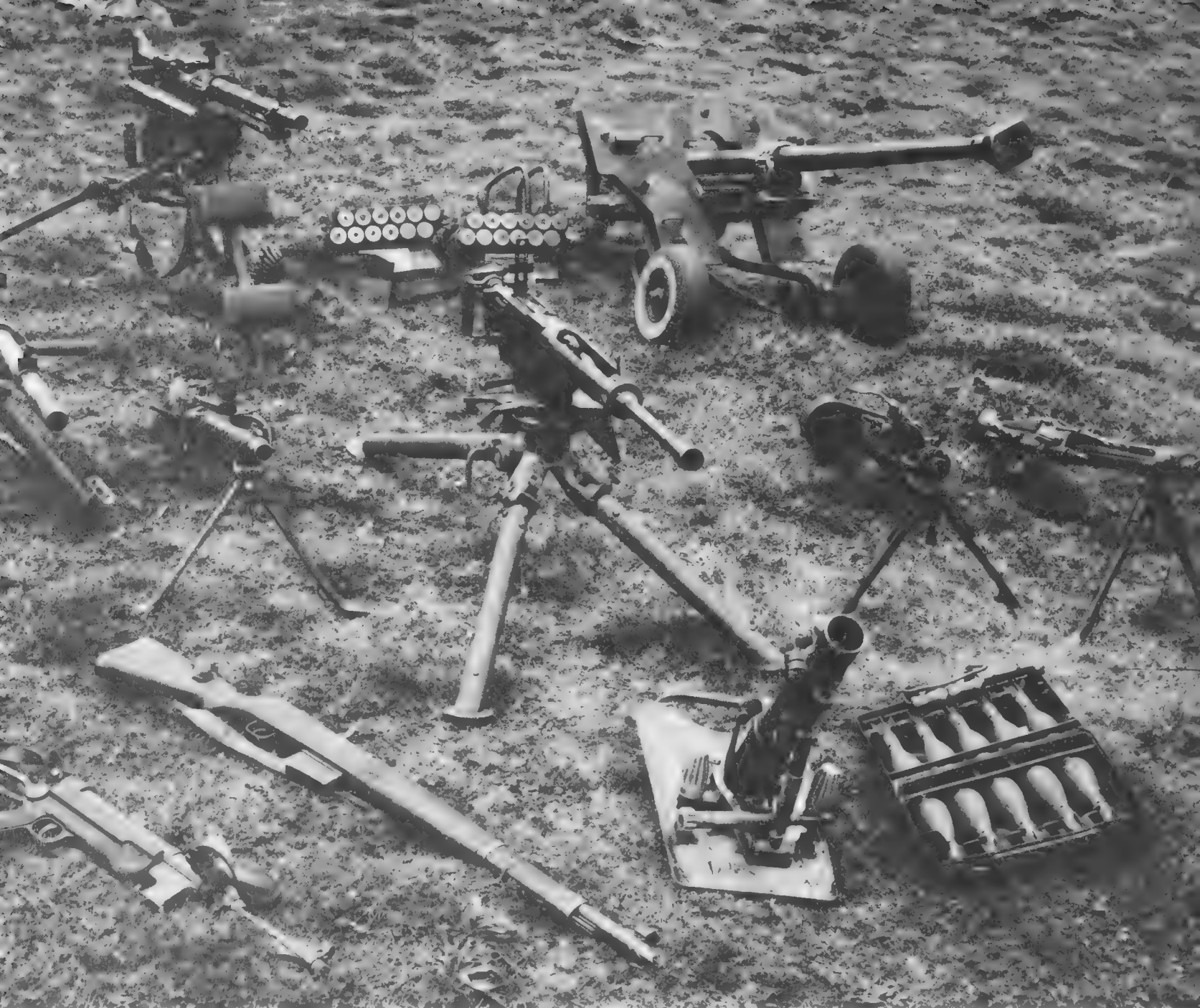
## TO THE GATES OF BERLIN

By early 1945, the Red Army stood on the borders of Germany in the east. Anglo-American forces, having broken through the Siegfried Line and on across the Saarland, were approaching the river Rhein.

On 16 February, Guderian mounted a last desperate counter-offensive to persuade the Russians to abandon a dash for Berlin and, instead, concentrate resources for a mass attack later in the Spring. More than a half-million German casualties had occurred during the retreat across Poland from the Vistula to the Oder. With the loss of Oberschlesien and the sequestered facilities in Poland, hard-pressed German industry could deliver no greater than a quarter of the monthly ammunition requirements. At this time, too, stockpiles of weapons and munitions were dwindling rapidly and – most importantly – the ability of the German railway system to transport them to where they were most needed was seriously threatened by Allied bombing. The quality of the smallarms also went into severe decline, as did the fighting qualities of the conscripts; to arm the Volkssturm (Home Guard) and the Hitler Youth, every conceivable gun was impressed into service.<sup>8</sup>

The arms industry could not hope to equip an estimated 3.5 million home-defence troops with traditionally-made weapons; finally, the HWaA had to sanction production of Volkswaffen on a local basis. Most of these were horrible – crudely made of bad materials, execrably designed and often sources of potential danger to the firer. The most interesting was the Volks-Gerät 1-5 (VG 1-5), a delayed blowback autoloader designed by Barnitzke of Gustloff-Werke under instructions from the Gauleiter of Thüringen, but comparatively few were made. Volksskarabiner 98, based on the standard Kar.98k, were made in the Walther and Steyr factories, while many small factories had been impressed to make sub-machine-guns modelled on the British Sten Gun. The story of these guns has never been satisfactorily told and, indeed, may never be known.

8. One famous picture shows an aged Volkssturm member, a veteran of the Great War, examining a pre-1890 Austro-Hungarian Mannlicher rifle with an expression of grave doubt.



As the Russians cleared the eastern part of the Reich and penetrated eastern Czechoslovakia, the Germans launched their final riposte – *Frühlingserwachen*, ‘awakening of Spring’. The offensive was launched on 6 March, limited successes being achieved until the Red Army hit back after correctly selecting one of the pro-German Hungarian armies blocking the route to Austria as the weakest part of the chain. Though the remnants of the German Panzer-Armee were successfully extricated, the collapse of the Hungarians allowed Tolbukhin, the Front commander, to march on Austria where Wien surrendered on 13 April 1945.

The day before *Frühlingserwachen* had been launched, Köln had capitulated in the west; the day afterwards, the US 1st Army crossed the river Rhein at Remagen; and, by the end of March, American,

British and Canadian troops were racing across western Germany. In doing so, they drew off troops from the Eastern Front and assisted the Russian passage to Berlin. With a distinct geographical advantage, Stalin determined to be there first.

Early in April, having cleared the Oder–Neisse line, the Red Army formed three new fronts under the command of Rokossovsky, Zhukov and Koniev. Zhukov had used his standing with Stalin to claim pole position for the final thrust.<sup>9</sup>

The offensive was launched on 16 April. The Germans actually managed to halt the Red Army in several places – most notably, when Zhukov’s First Byelo-

9. The Russians were also keen to prevent the Allies gaining too much of a foothold on what the Big Three’s Yalta conference had accepted as the Russian zone of postwar influence. The Americans were already making inroads towards the Elbe, and up into the Thüringen forest.

### 38 ABOVE

This cluttered picture of captured equipment is notable for the inclusion of a taper-bore anti-tank gun, the sPzB.41 (background right) and a Gew.41(W) in the foreground. Also visible are an MP.40, a 5cm mortar, two bipod-mounted machine-guns (an MG.15 and an MG.42), and three others mounted on tripods for heavy support. The MG.34 alongside the anti-tank gun, on an MG-Lafette 34, is accompanied by an Italian Mo.35 (centre) and Mo.37 (left edge). *By courtesy of the Trustees of the Imperial War Museum; negative no. H31026.*

ussian Front, under Sokolovsky, initially failed to breach the German defences. By 19 April, however, Koniev had crossed Berlin’s river Spree, close to Spremberg; and Sokolovsky had gained Munchenberg, less than thirty kilometres east of Berlin.

Hitler’s 56th birthday, on 20 April 1945, was marked by sporadic counter-attacks motivated by nothing other than a sense

of occasion. On 21 April, the Russian 2nd Guards Tank Army breached the outer ring of Berlin's defences at Werneuchen; the 1st Guards Tank Army and 8th Guards Army reached the south-eastern suburbs; and the 3rd Guards Tank Army stood at Königswusterhausen.

The German high command vainly awaited the 'counter-attack' to be launched by General Steiner, whose army existed largely on paper: three days later, the trap closed. Ammunition was almost all spent, morale was disintegrating and the fate of Germany's capital lay with old men, invalids and child-soldiers who faced the Soviet juggernaut. By now encircled, Berlin was to be taken street by street, block by block, against defenders just as tenacious as the Russians had been at Stalingrad. On 30 April 1945, the red-gold hammer-and-sickle flag flew above the shattered Reichstag.

Hitler was dead within 24 hours, Berlin had surrendered and a final curtain was lowered on a harrowing historical episode. The cost to Germany had been two million soldiers killed or missing (few of the prisoners were ever to return) and 2.2 million civilian dead, most of whom had perished in the great retreats of 1944-5 and Russian revenge for German rampages through the Ukraine and the Baltic States in 1941-2. British and Commonwealth casualties (dead, wounded and missing) to 10 April 1945 had amounted to 1.3 million servicemen, merchant seamen and civilians; the US armed forces had lost about 400,000 dead, mostly in the Pacific Theater; and the Red Army had lost 13.7 million men in combat. A further eleven million Russian civilians had also perished from war, privation, disease and atrocity.<sup>10</sup>

## THE ARMS INDUSTRY: DECLINE AND FALL

The comparative single-mindedness of Anglo-American and particularly Russian arms-production contrasted greatly with the fragmentation of German efforts during the Second World War. In Germany,

the armed services, the Waffen-SS and other paramilitary organizations each clamoured separately for attention. The situation is pithily summarized by Ian Hogg in *German Secret Weapons of World War 2* (Arms & Armour Press, 1970):

'It was not until the war ended and Allied investigation teams began to examine... the arms manufacturers and the files of the military departments, that the details of these developments (and of many more still in their infancy) came to light; the number of developments staggers the imagination.

'Indeed, it is this number which gives a clue to the mystery of why German technology failed to produce the superiority in armaments envisaged by Hitler.

'In Germany, however, no... central clearing house existed. Each service had its own research establishments, laboratories, proving grounds and ranges; each kept its researches secret from the other, and each scrambled against the others for factory facilities. If it were possible to get the ear of a high-ranking party official or, best of all, Hitler himself, then the most outlandish scheme had every chance to prosper...'

Millions of Reichsmarks were wasted in the development of legions of differing guided missiles – an area in which the Germans could have excelled had efforts

been properly co-ordinated – and in the production of rocket-powered aircraft, resources for which would have been better diverted to the two outstanding jets, the Messerschmitt Me.262 and Arado Ar.234. Ponderous super-tanks were designed at a time when the Red Army was showing the merits of mobility; and huge railway guns were prepared when funds should have been allotted to anti-tank gun production.

This is not to say that the German designers achieved little; the paradox is that they achieved so much that the *results* were minimal – the lack of overall direction ensuring that projects competed against each other, or that manufacturers were allowed too much freedom of action. Even after being ordered to concentrate on bomber design in the immediate pre-war period, for example, Heinkel had obstinately continued with a fighter to compete with the Messerschmitt Me.109 and then the Fw.190.

### 39 BELOW

One of the stranger modifications of the MG.34 was this 'overbank' mount and periscope sight. The design of the barrel casing shows that this was once a vehicle gun. *By courtesy of The Pattern Room, Enfield Lock.*



10. Such dreadful statistics are virtually meaningless to anyone born since the end of the war, as it is difficult to relate them to reality. The death toll of perhaps 55 million people is perhaps best understood by considering that it represents *every* person in Britain, or one in every four Americans.



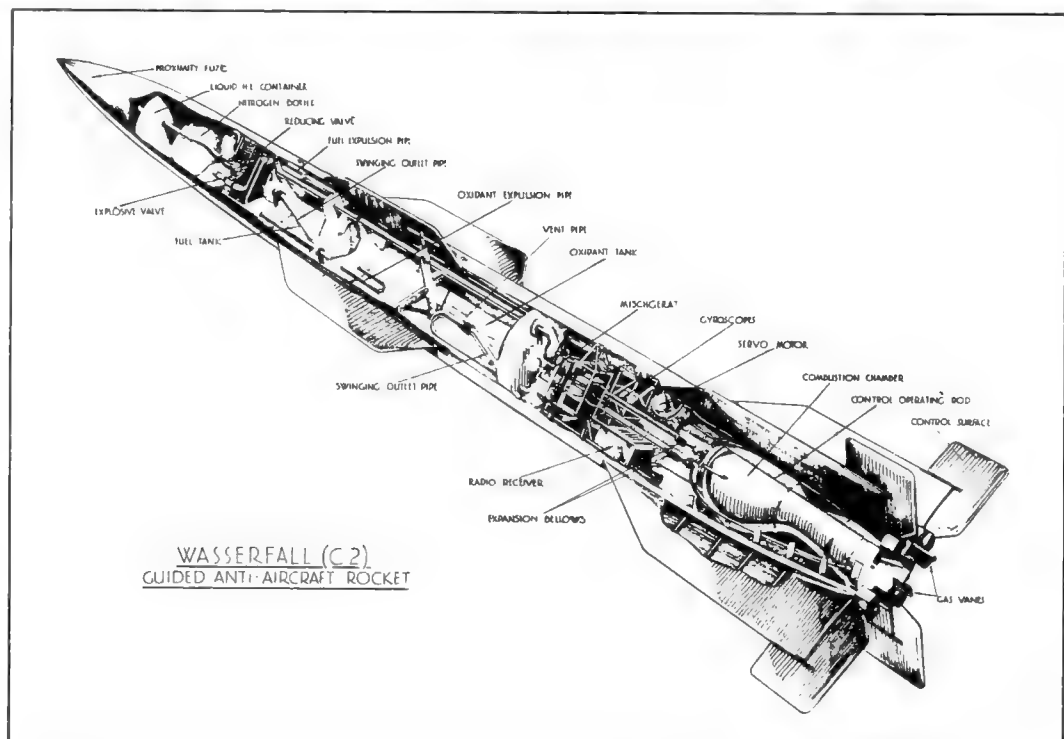


#### 40 ABOVE

A soldier of the 30th Infantry Regiment, 3rd Division, US Seventh Army, examines a damaged 'German Rocket Gun' (Raketenwerfer 43, Püppchen) captured near Le Colunvier, France, on 28 August 1944. Note the crude back sight above the trunnions and performance data inside the shield. The RWr.43 was elevated and traversed manually. *US Army photograph, via Ian Hogg.*

#### 41 RIGHT

C-2 or Wasserfall was a large guided anti-aircraft missile intended to counter high altitude long-range bombers flying at speeds of up to 880kph at a maximum ceiling of 20,000m. Weighing 3,500kg at launch, Wasserfall was 7.9m long and could accept a 300kg warhead. First fired on 28 February 1944, but accorded a much lower priority than the A-4, only about 25 Wasserfall missiles had been tested when the project was officially terminated in February 1945. Had the device been perfected by the beginning of 1944, Allied airmen would have received a particularly unpleasant surprise. *By courtesy of Ian Hogg.*





Few other of the major participants in the war, excepting possibly the Japanese, proved less able to co-ordinate weapons development programmes than the Germans. The result was perpetual duplication and a tendency to encourage the unencourageable.

Britain had had its fair share of crank designs, particularly in the dark days of 1940 when the Germans seemed likely to invade. However, even the Smith Gun and the Bates Six-barrel Bottle Thrower made sense in the context of 1940; admittedly the Giant Panjandrum did not, but its development was stopped immediately the authorities witnessed a test.<sup>11</sup>

Ridiculous-seeming ideas like a pipeline under the ocean, a floating airstrip and even an aircraft carrier made of ice reinforced with wood-pulp all proved feasible. A whole legion of strange armoured vehicles – the ‘Funnies’ – and an entire pre-fabricated harbour passed not only official inspection but also the ultimate test of service. Yet the British had little to rival the Zippermeyer Wirbelgeschütz, the sound cannon, the Hänslar Electric Gun or Cönders’ Tausendfüßler.

The hypnotic effect of these extraordinary weapons permeated downward even to the Heereswaffenamt. Though the curved-barrel project (Krummlauf) had a realistic goal, it was undoubtedly a waste of resources; the HF15 or höherer Feuerfolge, conceived by Hungarian Bela Zetl to achieve exceptionally high rates of fire, promised much but ultimately delivered nothing; Tromsdorff ramjet shells never achieved the requisite accuracy; rocket cartridges for smallarms proved predictably ineffectual; and even the Fallschirmjänergewehr 42 and the first assault rifle, the MP.43, conflicted with each other. The inability of the army and Luftwaffe authorities to co-operate resulted in two radically differing designs reaching production status when one would have been preferable.

Though both have now achieved near-mythical importance in smallarms history, neither was an outstanding success prior to 1945. Production of the FG.42 was interrupted initially by the withdrawal of vital manganese steel, causing a wholesale remodelling of the gun after no more than about 1,700 had been made, and a total production no greater than 7,000 was scarcely significant when 200,000-plus MG.42 machine-guns had been made in 1944 alone.

Far greater quantities were made of the MP.43/StG.44 series were made (about 285,000 in 1944), but the ambitious production programme was impossible to implement in the face of ever-increasing demands without teething troubles. Horrendous difficulties were experienced with the legions of sub-contractors, many of whom had little previous experience of gunmaking. Some parts were out of gauge, or simply would not fit; some broke, others were made of the wrong material. So many minor changes were made to the master drawings that guns made in March were not necessarily the same as those made in February, or those that would be made in April.

Lack of co-ordination between the armed forces and the paramilitary was

bad enough. But the German production effort was also hamstrung by high-ranking political interference – in 1941, the OKW had cancelled defensive projects that could not be completed within a year – and Hitler had himself ordered the suppression of the Maschinenkarabiner project in 1943.<sup>12</sup> He had also seen the Messerschmitt Me.262 jet fighter as a bomber, when its speed would have been a perfect counter to Allied bombers; and the facilities at the Peenemünde research station were frittered away on the A-4 (alias Vergeltungswaffe Zwei, or ‘V2’) rocket, whose ability to deliver high-explosive to London was comparatively negligible. The smaller C-2 Wasserfall anti-aircraft missile would have been more useful to the hard-pressed defenders of the Reich had it been accorded the development effort expended on the A-4 project.

Even without conflicting priorities, Germany would always struggle to obtain raw materials in any protracted

12. Though Hitler withheld recognition from the MKb.42 project, the army authorities persisted with it covertly. Eventually, Hitler changed his mind and gave the MP.43 – as it had become – his unqualified backing. However, Speer and others have estimated that the lack of enthusiasm delayed the project for at least a year. Had the guns entered service in quantity at the end of 1942, rather than 1943, and had sufficient ammunition been forthcoming, the balance of power in Russia may have been tipped in German favour at a critical moment.



#### 42 RIGHT

Dejected German troops tramp into captivity through the ruins of Berlin after the surrender of the city to the Russians at 1500hrs, 2 May 1945.

*Author's archives.*

11. The Panjandrum was a giant explosive wheel, not unlike a cable drum, propelled by rockets attached to the wheel-rims. It ran amok during its trials and was immediately scrapped.

campaign. The perceptive Basil Liddell Hart (*History of the Second World War*, Cassell, 1970) identified twenty raw materials essential to war:

'Germany had no home production of cotton, rubber, tin, platinum, bauxite, mercury, and mica, while her supplies of iron-ore, copper, antimony, manganese, nickel, sulphur, wool and petroleum were quite inadequate. By the seizure of Czecho-Slovakia, she had gone some way to reduce her deficiency of iron-ore, while by her intervention in Spain she had been able to secure a further supply of it on favourable terms, and also of mercury...

Again, she had succeeded in meeting part of her need for wool by a new wood substitute. Likewise, though at much greater cost than the natural product, she had provided about a fifth of her rubber requirement from "buna", and a third of her petrol needs from home produced fuel.'

The advent of war and the loss of the sea lanes to the Western Allies hit German imports strongly. Industry coped as long as the Wehrmacht was ascendant, but the situation changed dramatically as the Red Army drove the Germans out of the principal coal, ore and petrol-producing areas they had seized in eastern Europe. As this all but coincided with demands to accelerate weapons production, the results were predictable: declining quality, a higher percentage of failures at inspection, and a general loss of confidence in the products.

A reduction in the quality of explosives and propellant had been forced by shortages of nitrogen. Before any hydrogenation plants were bombed, Greater Germany had produced almost 100,000 tonnes of nitrogen compounds monthly; by December 1944, the total had dropped to virtually a fifth of the original level, and substantial rock-salt additives were appearing in explosives. Not surprisingly, performance deteriorated.

The apogee of German smallarms production – judged quantitatively – occurred in 1944. According to Albert Speer's memoirs, *Inside the Third Reich*, the average monthly production of rifles (mainly Kar.98k and Gew.43, but excluding MP.43) increased from 133,000 in 1942 to 307,000 in 1944; the figures for machine-guns were 7,100 and 28,700 respectively, the former being largely MG.34 and the latter MG.42; output of rifle ammunition, 76 million rounds in 1942, reached a staggering 486 million in 1944.

However, increasing difficulty was being encountered in distributing the weapons to the fronts. The disruptive effects of Allied bombing also began to be important, and the index of industrial production, 223 at the end of 1943, declined from 277 in December 1944 to 227 in January 1945, 175 in February and 145 in March.

Had bombing offensives been directed specifically at the Achilles' heel of the German war effort – the petro-chemical industry – rather than, comparatively ineffectually, at towns of cultural but no particular industrial significance, the arms industry would have been reduced to impotence more efficiently. There had been several heavy raids on Schweinfurt, known as the home of the German ball-and-roller-bearing industry, but the surprising failure of the Allied airforces to return after the Spring of 1944 allowed capacity to recover until, by September,

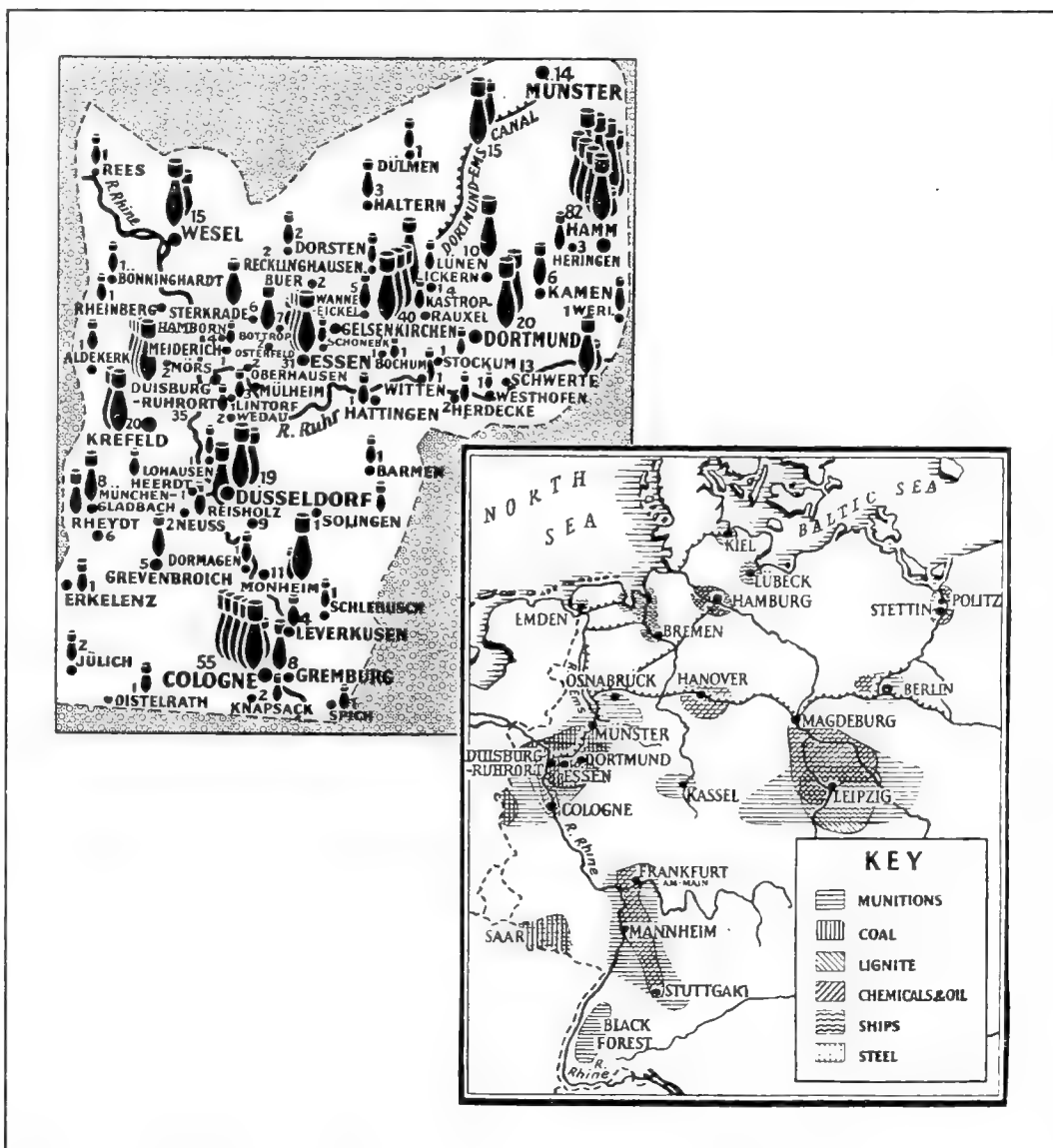
Schweinfurt had regained 94 per cent of pre-bombing output.

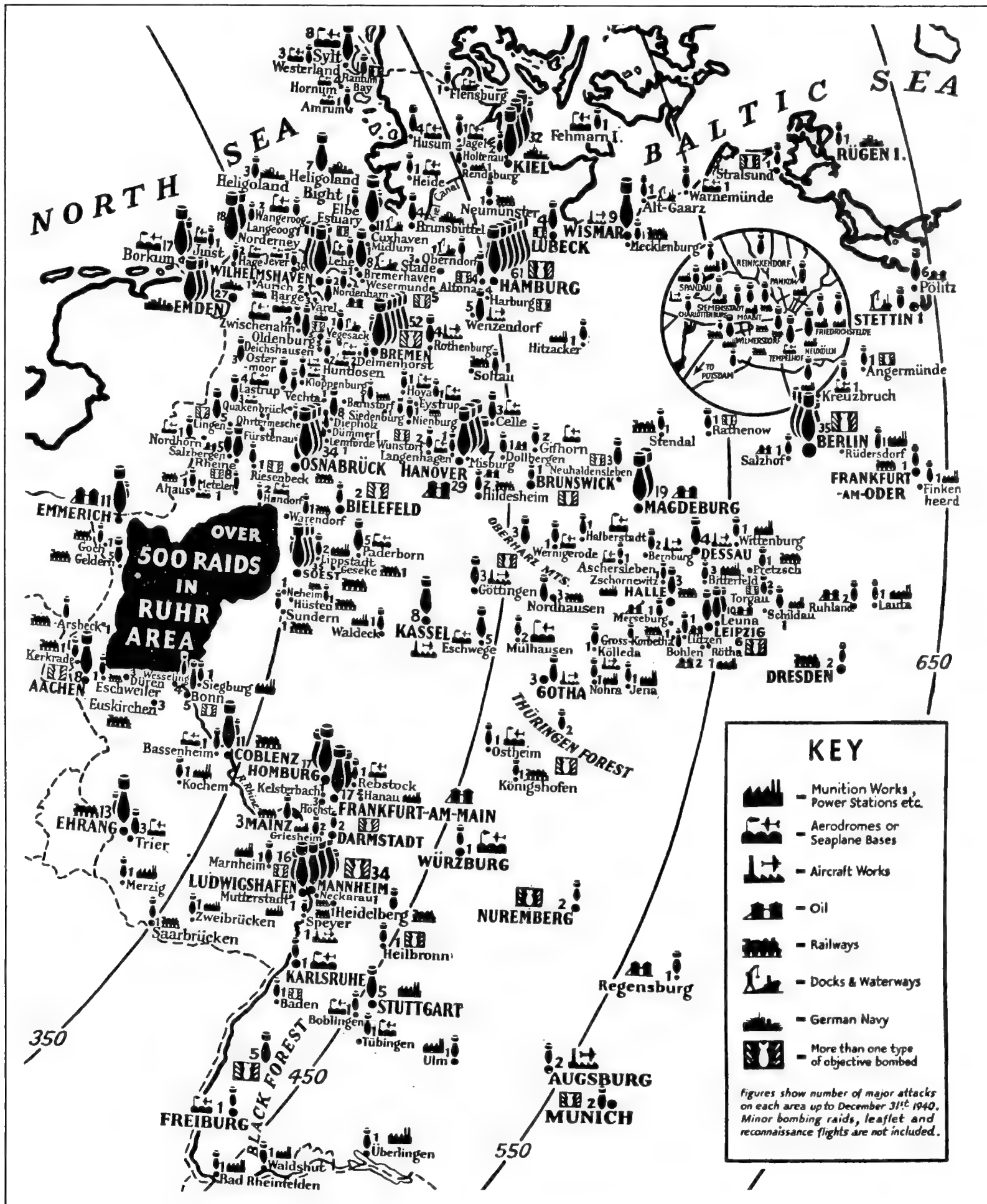
## POSTWAR INFLUENCE

Though the war ended for most of the arms makers in the Spring of 1945, the best of their ideas soon reappeared elsewhere. The Allies spent several years sifting through millions of documents,

### 43, 44 BELOW AND RIGHT

Produced during the Second World War, these British maps summarize both the diversity of targets and intensity of bombing of Germany during the first concerted raids (August-December 1940). By 1945, many of the major targets had been almost completely obliterated. However, deliberate re-location of vital industries in rural areas permitted the German arms industry to maintain its output almost to the end of hostilities. By courtesy of Her Majesty's Stationery Office; Crown Copyright.







confiscated valuable experimental data, and took away countless prototypes to test. However, interest was initially centred on the advanced forms of conventional weapon – notably the FG.42, but later the MG.42 – at the expense of the intermediate-cartridge assault rifles, as most Western armies still adhered to the classical theories of long-range accuracy at the expense of volume of fire.

The Russians, who had no such preconceptions, were so impressed with the MP.43 that comparable designs were being developed even before the end of hostilities. The SKS semi-automatic carbine was introduced in 1945 as an expedient, but the perfected AK (Kalashnikov) soon replaced it. Not until the late 1950s was the US Army convinced of the merits of intermediate cartridges, and not until the 1980s have they become universal in Europe.

In spite of the influences of the FG.42, MG.42, MP.43 and other guns, the greatest achievement of the German smallarms industry was the iconoclastic application

of simplified metalworking techniques to conventional service weapons. Previously, all major industrialized nations had made their guns by laborious and expensive traditional methods, keeping stamping, pressing and welding for 'emergency' weapons such as the Sten Gun.

The collapse of the Third Reich, accompanied by just as dramatic an extinction of the German arms industry, was not the end of the story. Many of the best ideas simply migrated to neutral countries – as they had done twenty years earlier – and re-emerged under different names. The roller-locked breech, copied from the MG.42, reappeared on the Swiss StGw.57, and also in the SIG MG710 series. It was embodied in the unsuccessful British Thorpe or EM-1 rifle, but the most important application was in Spain. There the Mauser roller-delayed blowback system, developed by Stähle, Altenburger and Vorgrimmler and tested in the MG.45V, Gew.45(M) and Gerät 06(H), became the CETME of the early 1950s. Ironically, once the Bundeswehr had been

#### 45 ABOVE

Typical of the many modern machine-guns based on the MG.42 are these Swiss-made MG710-2. Despite the considerable differences in the barrel unit, there are clear affinities with the wartime German design. *By courtesy of SIG.*

allowed to re-equip to face the German Democratic Republic and the Soviet Bloc, the CETME rifle was adopted as the G3.

Originally made by Rheinmetall and Heckler & Koch, the G3 rifle provided the basis for the many H&K adaptations that have helped rebuild German arms-making capacity for the third time in seventy years.

In addition to the G3, design of which may be attributed to Mauser prior to 1945, the Bundeswehr is currently equipped with the MG3 – a slightly modified MG.42 made by Rheinmetall – and the P1, a version of the Pistole 38 still made by Walther. No other industrialized Western power issues smallarms with pre-1945 origins so universally, which is a great tribute to the skill of the original designers.



# TWO

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## THE CHRONOLOGY

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A concise guide to the most important political and military events occurring during the Third Reich.



# CHRONOLOGY

## 1939

### AUGUST

23: initialling of a Russo-German non-aggression pact, in which secret clauses partition Poland in the event of war. Neville Chamberlain warns that Britain must fulfil obligations to Poland, but Hitler, unimpressed, reaffirms his interest in Danzig and the Polish Corridor. 26: Hitler 'guarantees' to respect the neutrality of Belgium, Holland, Luxembourg and Sweden. 31: Hitler orders attack on Poland.

### SEPTEMBER

1: the Wehrmacht invades Poland; Danzig is immediately annexed. 3: Britain and France declare war on Germany. 5: German troops cross the river Vistula. 11: Germans cross the river San. 23: Wehrmacht units withdraw to the demarcation line agreed with Russia. 27: Warsaw surrenders. 29: the Russo-German friendship treaty partitions Poland.

### OCTOBER

6: the last remnants of the Polish army capitulate.

### NOVEMBER

14: Germany rejects peace appeals from Belgium and the Netherlands.

### DECEMBER

13: the Battle of the River Plate is fought between the German pocket battleship *Graf Spee* and three British cruisers. 17: *Graf Spee* scuttles.

## 1940

### JANUARY

4: Hermann Göring, as minister of the interior, takes control of Germany's war industries.

### FEBRUARY

11: a Russo-German economic pact is initialled. 24: the first plans for the Wehrmacht's western offensive are completed.

### APRIL

2: preparation for invasion of Denmark and Norway (Operation 'Weserübung') is made. 7: an Allied force sails for Norway. 9: Operation 'Weserübung' begins: German forces immediately overrun Denmark and invade Norway. 10: the first Battle of Narvik fails to slow rapid German advance northwards from Oslo. 13: second Battle of Narvik. 15: British forces land near Narvik to meet Germans advancing northward from Oslo. 20: French troops also

land in Norway. The Danish army is demobilized. 24: British forces cannot reach Trondheim and, despite desperate fighting north of Lillehammer, retreat two days later.

### MAY

1: Norwegian armed forces surrender in Lillehammer. 2: Wehrmacht Gebirgsjäger reach Andalsnes; the Allies evacuate Namsos. 9: Hitler finally sanctions the invasion of western Europe. 10: German forces attack the Low Countries. Neville Chamberlain resigns in favour of Winston Churchill. 11: German advances rapidly cross the Albert Canal, where Fort Eben-Emael falls to Fallschirmjäger. 14: a German air raid on Rotterdam persuades Dutch troops to cease fighting. 15: the Netherlands capitulate while Rommel's tanks overwhelm the French defenders of Sedan. 18: Wehrmacht forces capture Antwerp and cross the river Sambre to gain Amiens. 20: Kleist's tanks reach the Channel coast, entrapping Allied forces in the north. 24: Hitler, worried about the incredible speed of the advance, orders his mechanized units to halt. 26: Operation 'Dynamo', the evacuation of Allied troops at Dunkirk, commences. 27: the Belgian army capitulates. Calais falls. 29: Wehrmacht units seize Ypres, Ostend and Lille.

### JUNE

3: the Luftwaffe bombs Paris. Operation 'Dynamo' ends successfully with the evacuation of thousands of British and Franco-Belgian troops. 5: the Battle of France begins. 7: the Armée de l'Air bombs Berlin in retaliation for Luftwaffe raids on Paris two days previously. 10: Italy declares war on Britain and France. Norway finally capitulates. 12: the Germans take Rheims. 14: the triumphant entry of German units into Paris coincides with attacks on the Maginot Line. 15: Verdun falls. 19: the Germans advance on Lyon. 22: a Franco-German armistice is signed at Compiègne, ironically, in the same railway carriage in which German representatives had signed surrender documents in November 1918. 25: Hostilities in France end. 27: the first Wehrmacht units reach the Franco-Spanish frontier. 30: Germans occupy Guernsey.

### JULY

1: the French government moves to Vichy. German forces seize Jersey. 5: the RAF commence night bombing of Germany. 10: the Battle of Britain begins.

### AUGUST

1: Molotov reaffirms Russo-German friendship pact. 13: Adlertag ('Eagle Day'), the apogee of

the Battle of Britain. 17: 'total blockade' of Britain is announced in Germany.

### SEPTEMBER

3: Operation 'Sea Lion', the invasion of Britain, is set for 21 September. 5: Vichy France breaks relations with the Low Countries and Norway. 7: the first heavy air attack on the Port of London signals the onset of the Blitz. 17: Hitler postpones Operation 'Sea Lion'.

### OCTOBER

7: German troops march into Romania. 12: Operation 'Sea Lion' is again postponed, this time until April 1941. 28: Italian armed forces invade Greece.

### NOVEMBER

7: the RAF hits the Krupp factory in Essen. 14: Luftwaffe bombers strike at Coventry. 29: the Oberkommando der Wehrmacht issues the drafts for the invasion of Russia.

## 1941

### FEBRUARY

3: *Scharnhorst* and *Gneisenau* break out through Skagerrak into the North Sea. 8: the Lend-Lease Bill is passed by US House of Representatives. 10: Mussolini is offered (and grudgingly accepts) a German armoured division to reinforce his campaigns in North Africa. 12: Erwin Rommel arrives in Tripoli. 22: Axis forces under Rommel's command attack El Agheila.

### MARCH

1: Bulgaria joins the Axis. 2: German troops occupy Bulgaria on the pretext of mutual co-operation. 6: the Luftwaffe mines the Suez Canal. 16: Hitler claims that the war will resolve in his favour before the end of 1941. 19: Germany presents an ultimatum to Yugoslavia. 30: Rommel commences an attack in Cyrenaica.

### APRIL

4: the German forces in North Africa take Benghazi. 6: a German army invades Greece and Yugoslavia. 7: Rommel seizes Bardia. 11: Coventry is devastated by the Luftwaffe. 12: Belgrade, the Yugoslavian capital, capitulates. 13: Rommel encircles Tobruk. 22: Greek armies in Thessaloniki surrender, forcing the withdrawal of British troops. 26: Fallschirmjäger take Corinth. 27: Wehrmacht units triumphantly enter Athens. 28: Rommel captures Sollum, while the last British forces leave Greece. 30: German occupation of mainland Greece is completed.

MAY

15: British forces retake Sollum and Halfaya Pass in North Africa. 20: Operation 'Merkur', the German invasion of Crete, commences. 27: *Bismarck* is finally sunk in the Atlantic. 31: the last British troops leave Crete.

JUNE

13: Tass denies Russo-German antagonism. 17: Rommel forces British troops in North Africa back towards Egypt. 18: a Germano-Turkish friendship pact is declared. 22: Operation 'Barbarossa' – Germany invades Russia, while Italy and Romania also declare war on the USSR. 23: German forces take Vilna and Kaunas in the Baltic states. 26: Daugavpils falls. 30: Wehrmacht units capture Lwow.

JULY

1: Riga falls. 3: Josef Stalin orders a scorched earth policy to restrict German advances. 8: Yugoslavia is partitioned by Germany and Italy. 9: German forces seize the Minsk pocket and Vitebsk. 10: the first German mechanized troops cross the river Dniepr. 12: the Anglo-Soviet Mutual Assistance Agreement is ratified. 15: Smolensk falls to the Wehrmacht. 18: Stalin requests the opening of a Second Front, but Britain and the Allies are in no position to respond. 20: Stalin appoints himself People's Commissar for Defence. 21: the Luftwaffe bombs Moscow. 22: a month after the invasion began, the Germans are finally halted at Lake Ilmen.

AUGUST

2: the US and USSR agree an aid programme. 5: Soviet resistance in Smolensk finally ends. 7: Stalin appoints himself Supreme Commander and immediately orders the Russian airforce to raid Berlin. 16: Novgorod falls to be followed, two days later, by Nikolayev. 19: the Germans complete the entrapment of Leningrad. 24: a Russian counter-attack is mounted at Gomel, without tangible success. 25: German

mechanized forces consolidate at Dnepropetrovsk. 29: the Red Army evacuates the Karelian Isthmus.

SEPTEMBER

5: the Wehrmacht completes the occupation of Estonia. 8: Leningrad is finally cut off by German tanks. 12: winter snows slow the German offensives in Russia. 15: Kleist's and Guderian's Panzers, meeting at Lohvitsa, entrap four Russian armies. The siege of Leningrad commences. 19: German forces take Kiev and Poltava. 26: Hitler demands an offensive against Moscow, while winter halts operations eastward from Kiev.

OCTOBER

2: the Wehrmacht launches a fierce, but initially unsuccessful attack against Moscow. 7: German mechanized units pen Soviet forces into pockets around Vyazma and Bryansk. 8: Orel falls, followed eight days later by Odessa. 24: German forces take Kharkov. 27: the Red Army counter-attacks to defend Moscow. 29: the Wehrmacht breaks through into Crimea. 30: Moscow is attacked again.

46 BELOW

'Unsere Wehrmacht. "Augen rechts" ...': troops shouldering Kar.98b, with leaf sights, give the traditional salute to an unseen superior. Note the SG.84/98, all of which are wood gripped. From a postcard published by 'B.N.K.', c.1935, sent from Munsingen to Kreuzingen in August 1939. LPI



## NOVEMBER

1-9: Simferopol, Kursk and then Yalta fall to German advances. 15: renewed German attacks on Moscow are paralysed by 'General Winter' – 20° of frost. 16: the Germans take Kerch and drive for Rostov-on-Don. 20: a tank battle in the Western Desert, at Sidi Rezegh, resolves in the Afrika Korps' favour. 23: Rommel destroys the South African 5th Brigade. 26: a full-scale German attack on Moscow, launched the previous day, is halted a mere 30km distant. 28: a Russian counter-attack retakes Rostov-on-Don.

## DECEMBER

5: Hitler reluctantly abandons his Moscow offensive until the spring thaw. 6: a Soviet counter-offensive commences in the worst conditions imaginable. 11: US declares war on Italy and Germany. 24: 8th Army retakes Benghazi. 26-9: Red Army forces raise the siege of Sevastopol and re-take Kerch.

## 1942

## JANUARY

9: Russians re-enter the Smolensk district. 17: German units in Cyrenaica surrender. 18: the three major Axis powers – Germany, Italy and Japan – sign a co-operation pact. Timoshenko launches a new Russian offensive against the Germans. 21: Rommel begins the reconquest of Cyrenaica. 23: Russian troops achieve a breakthrough in the Smolensk/Lake Ilmen area. 28: Russian forces advance into the Ukraine.

## FEBRUARY

4: the Afrika Korps capture Derna. 5: Rommel's advance stops at Gazala. 8: Albert Speer succeeds Dr Fritz Todt, killed in an air crash, as head of the construction programme. 11: Operation 'Cerberus' – *Scharnhorst*, *Gneisenau* and *Prinz Eugen*, accompanied by a screen of smaller vessels, make a successful dash up the English Channel.

## MARCH

1: the Russians launch an offensive in Crimea. 15: Hitler rashly predicts the total destruction of the Red Army in the summer of 1942. 28: the Royal Navy successfully destroys dock facilities in St Nazaire.

## MAY

8: the German summer offensive begins in Crimea. 9: Timoshenko pushes from Kharkov toward the river Donets. 13: Russian forces make a bid to take Kharkov, but are forced to withdraw elsewhere. 16: German forces take Kerch. 17: the Germans blunt the Russian offensive aimed at Kharkov. 20: German troops recapture the entire Kerch peninsula. 26: units of the Afrika Korps attack the Gazala Line. 28: important German successes occur around Kharkov.

## JUNE

5: the German siege of Sevastopol begins. 9: renewed German attacks on Russian forces around Kharkov. 17: British withdrawal to Egypt

isolates the Tobruk garrison. 21: Afrika Korps take Tobruk. German forces establish a foothold in Sevastopol. 24: Rommel advances as far as Sidi Barrani. 27: Afrika Korps reaches Mersa Matrüh. 28: a fresh German offensive aims at Kursk. British forces withdraw to El Alamein. 30: Rommel reaches El Alamein.

## JULY

2: British counter-attacks force Afrika Korps out of El Alamein. 3: Germans take Sevastopol. 4: German forces reach the river Don. 7: German units capture Voronezh. 22: German offensive to take Rostov-on-Don begins. 30: Stalin expressly forbids retreat. 31: Russians retreat from Don in the face of a concerted German advance.

## AUGUST

9: Germans take Krasnodar. 12: important German gains occur in Kuban. 19: Paulus orders the taking of Stalingrad. 24: the Red Army mounts counter-offensive south of Lake Ladoga to relieve Leningrad. 28: German forces make slow progress around Stalingrad. 31: the Battle of Alam Halfa begins in the Western Desert.

## SEPTEMBER

5: Novorossiisk falls to the Germans. 16: German troops enter the suburbs of Stalingrad. 30: 8th Army launches an offensive from El Alamein.

## OCTOBER

14: Hitler orders the Wehrmacht to stand fast in the East. 23: opening phases of the Battle of El Alamein. 26: heavy fighting in Stalingrad.

## NOVEMBER

2: the Allied thrust from El Alamein (Operation 'Supercharge') commences. 4: German and Italian forces begin to retreat from El Alamein. 8: commencement of Operation 'Torch', the Allied invasion of North Africa. 10: Germans evacuate Sidi Barrani. 11: German and Italian troops occupy Vichy France and Corsica, while the Allies seize Casablanca. 13: 8th Army reaches Tobruk. 19: the Red Army winter offensive begins, with a counter-attack at Stalingrad. 20: 8th army reaches Benghazi. 23: the Russians encircle the Germans in Stalingrad, whom Hitler orders to consolidate their position. 28: Russians pierce German defences on the central front.

## DECEMBER

12: German offensives unsuccessfully attempt to relieve Stalingrad garrison. 13: Axis forces retreat from El Agheila in the Western Desert. 16: Russian forces annihilate Italian armies on the river Don. 21: 8th Army overwhelms an Afrika Korps rearguard at Sirte. 22: the Red Army gains in the Stalingrad and Don areas. 25: 8th Army occupies Sirte. 28: Hitler agrees to withdraw Army Group A from the Caucasus.

## 1943

## JANUARY

1: a Russian offensive toward Rostov-on-Don

commences. 3: German withdrawal from the Caucasus begins. 18: Russian forces raise the siege of Leningrad. 23: 8th Army enters Tripoli. 26: Russian units encircle and then capture Voronezh. 28: the entire German labour force is put on a 'total war' footing. 31: the southern group of the German VI. Armeekorps surrenders at Stalingrad.

## FEBRUARY

6: the Russians reach the Sea of Azov. 8: Russian forces take Kursk. 14: Afrika Korps launches a counter-attack in Tunisia. 16: Russians take Kharkov and Voroshilovgrad, while, in the Western Desert, 8th Army takes part of the Mareth Line. 20: German units break through the Kasserine Pass. 25: Allied forces push the Germans back through the Kasserine Pass again.

## MARCH

1: a Russian offensive takes Demyansk. 2: German Panzer units retreat in the Western Desert. 6: Rommel relinquishes command of the Afrika Korps to Sixt von Armin. 15: German forces recapture Kharkov. 20: 8th Army begins an all-out attack on the Mareth Line. 28: Mareth falls to 8th Army units.

## APRIL

6: 8th Army attacks Wadi Akarit, linking with US forces the next day. 19: the Warsaw Ghetto rises against the German occupation forces.

## MAY

3: Red Army forces halt German advances in Kuban. 7: Allied forces overrun Tunis and Bizerta. 12: German forces in North Africa surrender. 17: the RAF bombs the Möhne and Eder dams, temporarily flooding parts of the Ruhr and reducing German industry to chaos.

## JULY

5: the last major German offensive is launched on the Eastern Front, near Kursk. 9: Anglo-American airborne forces land on Sicily. 10: the main invasion force lands on Sicily (Operation 'Husky').

## AUGUST

5: Russians take Orel and Belgorod. 6: a partial evacuation of Berlin commences, while German troops are ordered into Italy. 12: German troops begin to return to the Italian mainland from Sicily. 22: German forces capture Kharkov, but the Russians re-take the town a day later. 26: Russian offensives begin in the Ukraine.

## SEPTEMBER

3: the first Allied landings in Italy occur. 7: a total evacuation of the Ukraine is ordered by German high command. 8: Italy capitulates, while the Russians re-take the Donets basin. 9: the Allies invade Italy at Salerno and Taranto. 10: German forces occupy Rome, while the British take Taranto. 22: Allied forces land at Bari. The Russians, in addition to crossing the river Dniepr, take Poltava. 25: Smolensk falls to Russian advances.



## OCTOBER

1: 5th Army captures Napoli. 13: Italy declares war on Germany. 25: Russian forces retake Dnepropetrovsk and Dneprodzerzhinsk.

## NOVEMBER

6: Russian units recapture Kiev. 18: in an unusually heavy air-raid on Berlin, RAF planes drop more than three hundred 4,000lb bombs in thirty minutes.

## DECEMBER

2: Hitler orders German youth to enlist. 3: Russians commence a robust advance. 12: Rommel is appointed to command 'Festungs Europa'. 14: a Russian winter offensive begins. 26: the Red Army attacks the Kiev salient, while the Royal Navy sinks *Scharnhorst* in the Battle of the North Cape. 31: Russian forces recapture Zhitomir.

## 1944

## JANUARY

2: Russian forces approach the pre-1939 Russo-Polish border. 5: 8th Army attacks Cassino. 6: Russians advance into Poland and, a day later, into the Ukraine. 15: Russian offensives to free Leningrad and Novgorod districts commence. 19: Novgorod falls. 22: 5th Army lands at Anzio. 24: Hitler orders the Gustav Line to be held to the death. Russians re-take Pushkin. 27: final relief of Leningrad.

## FEBRUARY

1: Russian forces reach the Estonian border. 7: the German counter-attack begins at Anzio. 12: Allies are pushed back virtually into the sea at Anzio. 16: a second German counter-attack on Anzio begins. 18: the Luftwaffe begins a series of raids on London ('Little Blitz'). 19: Allies rally to repulse German attacks on Anzio.

## MARCH

1: Fritz Sauckel claims that of five million migrant workers in Germany, less than a quarter-million 'volunteered'. 4: the USAF bombs Berlin for the first time. 6: Russian forces advance into the Ukraine. 18: the RAF devastates Hamburg. 23: Russians reach the Dniestr river. 28: Nicolayev falls to the Red Army.

## APRIL

7: German forces thrust through Russian lines. 8: Russian forces reach the former Czechoslovak border. Final offensives begin in Crimea. 10: Red Army men take Odessa and, a day later, Kerch. 16: by recapturing Tarnopol, the Russians effectively split the Axis forces in two.

## MAY

7: the final Russian attack on Sevastopol begins. 9: Sevastopol falls to the Red Army. 11: 5th and 8th Armies attack the Gustav Line. 12: Allied forces advance in Italy, while the last Germans are evacuated from Crimea. 15: withdrawal from the Gustav Line to the Adolf Hitler Line begins, the former being overrun the following day. 18:



Polish forces finally take the shattered Cassino monastery. 22: Canadian units rupture the Adolf Hitler Line. 23: breakout from Anzio commences. 31: a German counter-attack is launched in Russia.

## JUNE

4: 8th Army enters Rome. 6: D-Day. Allied forces invade Normandy. 7: Bayeux reached by Allies. 12: the Normandy beachheads finally link. 13: V-1 flying bombs, or 'Doodlebugs', land in southern Britain for the first time. 18: Russians break through Mannerheim Line, 8th Army takes Assisi, and US forces isolate Cherbourg. 27: Russians cross river Dniepr. 29: the Germans garrisoning Cherbourg capitulate.

## JULY

3: Red Army forces recapture Minsk. 9: 2nd Army takes Caen. 11: Russian attacks on 'Panzer-Linie' begin. 13: the Russians take Vilna, and launch an offensive in the northern Ukraine. 16: 8th Army takes Arezzo and reaches the river Arno. 17: Russian forces cross the river Bug and enter Poland, while 8th Army crosses the Arno and drives for Firenze. 18: US Army captures St Lô. 20: an attempt is made to assassinate Hitler (the 'Bomb Plot'). 27: Russian troops take the Polish town of Lwow, then Brest-Litovsk, Yaroslavl and Przemsyl a day later. 29: the first Me.163 rocket fighter is encountered in combat.

## AUGUST

1: Russian forces sever the remaining links between Ostpreussen and the Baltic states. 6: Allied forces reach Brest and liberate Nantes. 14: a Soviet summer offensive across the Vistula begins. 15: Allied forces invade southern France (Operation 'Anvil'). 17: Russian forces reach Ostpreussen. 20: US forces cross the river Seine and close the Falaise Gap. Free French enter Toulon. Russian forces commence an offensive against Romania. 25: Allied forces liberate Paris. 28: Marseilles surrenders. 29: Free French troops cross the river Rhône. 30: Russian forces take Ploesti.

## SEPTEMBER

3: British forces liberate Brussels, while the Free French take Lyons. 4: the British re-take Antwerp. Russians advance through Romania. 8: the first V-2 (A-4) rocket lands in Chiswick, West London. 10: commencement of Operation 'Market Garden' to secure the Rijn bridge at Arnhem. 11: US Army patrols cross the border into Germany. 12: US 1st Army crosses into Germany near Aachen. 15: US forces breach the Siegfried Line. 17: 1st Allied Airborne Army lands at Eindhoven and Arnhem. 18: German counter-attacks threaten the Arnhem operation. 20: Anglo-American units seize the Nijmegen bridges, but, the next day, the British units at Arnhem are finally destroyed. 23: the Red Army reaches the Gulf of

Riga. 24: British 2nd Army enters Niederrhein. 25: the formation of Volkssturm announced. 30: Calais surrenders.

## OCTOBER

2: Russian offensives begin in northern Finland, but the Warsaw uprising collapses. 10: Russian forces reach the Baltic coast. 13: US armed forces reach and take Aachen. 15: Hungary unsuccessfully seeks an armistice. 18: all German males between the ages of 16 and 60 are ordered into Volkssturm units. 23: Russians enter Ostpreussen. 27: a new Red Army offensive into Latvia begins.

## NOVEMBER

12: the RAF finally sinks *Tirpitz* in Tromsøfjord. 18: US 3rd Army crosses the German border. 24: Allied forces cross Saarland while the French liberate Strasbourg. 29: Russian forces cross the Danube.

## DECEMBER

5: US forces penetrate Germany on a broad front. 6: US 3rd Army crosses Saarland. 16: the 'Battle of the Bulge' commences in the Ardennes. 22: German forces in the Ardennes drive for the river Meuse, but are repulsed on Christmas Day. 26: US armoured units relieve Bastogne.

# 1945

## JANUARY

1: major Luftwaffe attacks on Allied air bases in France and the Low Countries are mounted for the last time. 11: the Russians enter Warsaw. 16: the Ardennes salient reduced by US 1st and 3rd Armies. 18: a German offensive pierces the Russians lines south of Budapest. 19: Russian forces take Tilsit and Cracow. 21: Russians capture Tannenberg. 25: Red Army units cross the river Oder near Breslau. 27: Russians take Memel.

## FEBRUARY

1. US 7th Army reaches the Siegfried Line. 4: commencement of the Yalta conference. 6: Russian forces cross the upper reaches of the river Oder. 9: Anglo-Canadian units pierce the Siegfried Line and reach the Rhein. 11: Russian units threaten Breslau and Dresden. 13: an RAF 'Terror Raid' devastates Dresden, reinforced by the USAF a day later. 15: Russian forces encircle Breslau and drive for Danzig. 21: Anglo-Canadians enter Goch in the Rheinland. 23: Russian forces seize Poznan.

## MARCH

1: US forces take Münchenglbadach. 5: Köln falls to the Americans, while, in the East, Russian units approach Stettin. 6: a major German counter-offensive strives for Budapest. 7: US 1st Army crosses the river Rhein at Remagen. 10: US 1st and 2nd Armies link on the Rhein. 12: Russian forces take Küstrin. 19: Hitler orders industrial areas threatened by Allied advances to be destroyed. 22: Russians invest Danzig and Gdynia. 25: US 3rd Army crosses the river Rhein,

capturing Darmstadt, while US 9th Army links with British forces and, elsewhere, Russian forces advance on Austria. 28: Gdynia falls to the Russians, who also reach the Austrian border. 30: Russian forces finally take Danzig.

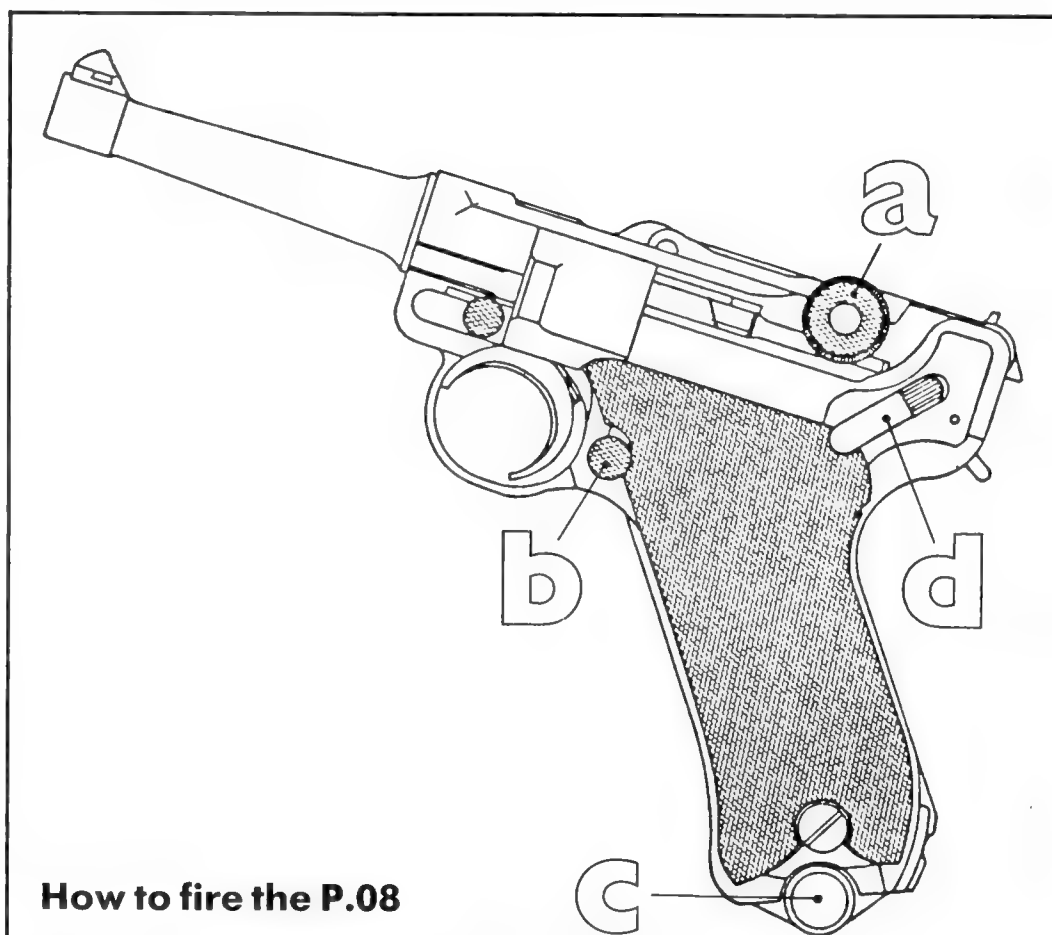
## APRIL

1: US 1st and 9th Armies encircle the Ruhr. 4: US forces cross the river Weser, while the French 1st Army seizes Karlsruhe. 9: the Russians take Königsberg. 10: Hannover falls to US forces. 11: US 3rd Army enters Weimar, 7th Army reaches Schweinfurt and 9th Army threatens Essen. 13: Russian forces occupy Wien. 15: Canadians reach the seacoast in northern Netherlands. 16: Russian offensives towards Berlin begin along the Oder-Neisse line. 19: the British assault Bremen, while US 1st Army takes Halle and Leipzig. 20:

Nürnberg falls to the US 7th Army. 21: Russian forces penetrate the outer suburbs of Berlin, where a German counter-attack fails. Frenchmen take Stuttgart. 23: units of the Red Army break into Berlin. 24: Red Army Fronts join forces inside Berlin, while Anglo-Canadians take Bremen. 25: the Red and US Armies make contact at Torgau. 28: Mussolini is captured and executed by Italian partisans. 29: unconditional surrender of German forces in Italy signed in Caserta. 30: Hitler commits suicide in the Führerbunker.

## MAY

2: Berlin is completely subdued by the Red Army, while the British 2nd Army reaches the Baltic coast. 7: Jodl signs an unconditional surrender of all remaining German forces. 8: VE-Day is proclaimed.



## How to fire the P.08

Starting with the gun in its fired condition, with an empty magazine in place and nothing in the chamber:

- Holding the pistol in the right hand, pull upward on the toggle-grips **A** until the action is held by the hold-open in the frame well; any spent case (or even a live round) will be ejected from the chamber.
- Press the magazine catch **B** to release the empty magazine **C**, and withdraw it from the butt.
- Replenish the magazine, or, if a fresh one is to hand, insert it in the butt and push it upward until the magazine catch springs back into place.
- The toggle mechanism should not close automatically as the magazine is inserted, and must be retracted slightly before it can run forward to load the first round into the chamber.
- If the safety lever **D** is in its forward position, the gun may be fired; to lock the sear, the bar is simply rotated backward to expose (on German service pistols at least) the word GESICHERT.
- When the last round has been fired, and automatically ejected, the toggle mechanism will stay open; it can be shut by pressing down on the magazine follower, holding the toggle back until it can be gently run forward.

# THREE

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## THE PISTOLS

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The handguns of the Third Reich, German-made and captured weapons alike, from the Parabellum to the Volkspistole.



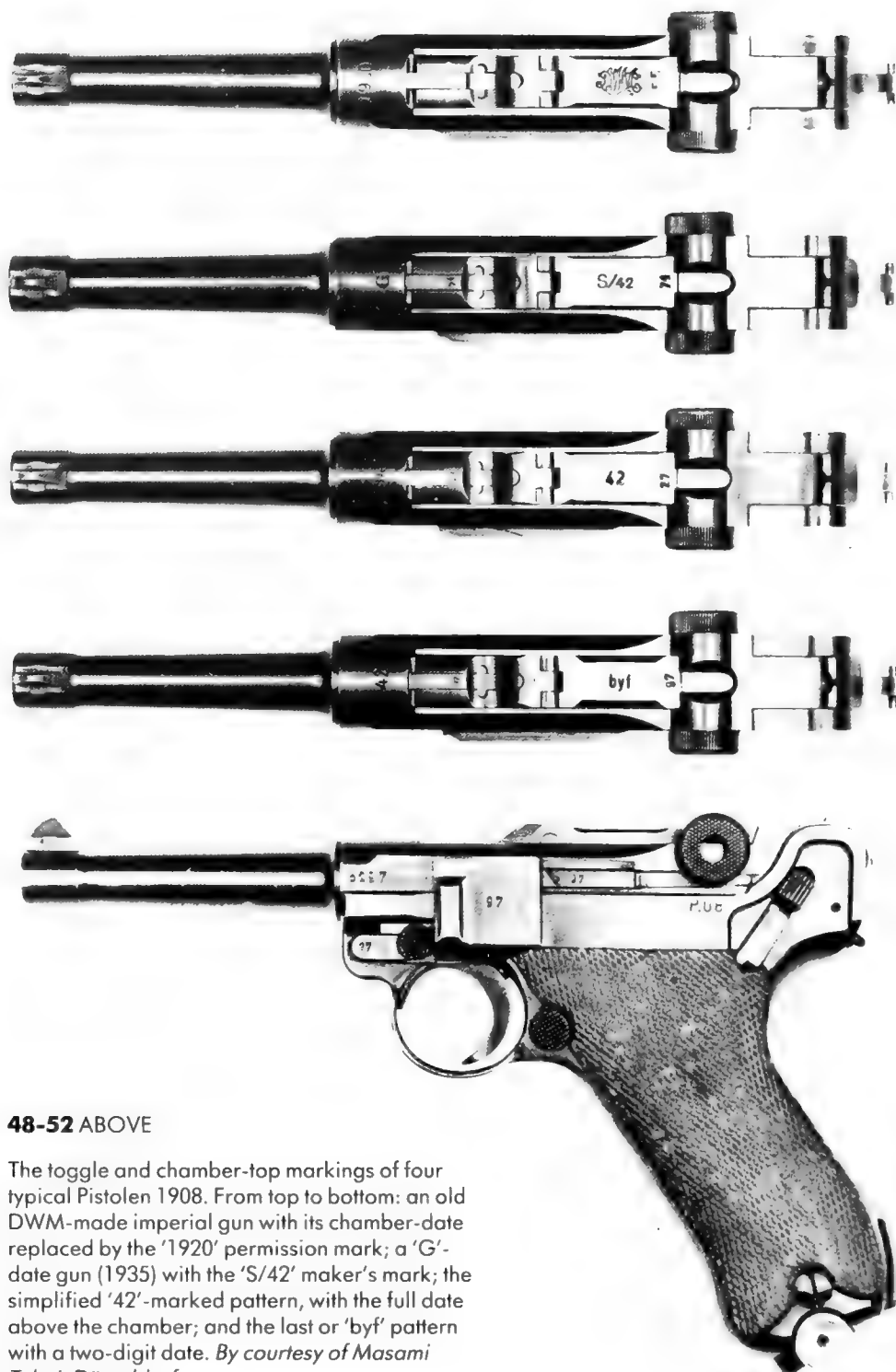
# Pistols

When Hitler gained power in 1933, the service pistol of the German armed forces was still the 9mm Pistole 08 (Parabellum or 'Luger'), which had been adopted in August 1908. The gun was unusually accurate, but difficult and expensive to mass-produce. And neither was it always as reliable as some of its competitors.

## THE PARABELLUM

This recoil-operated pistol relied on a distinctive strut-and-pivot toggle-lock system. When the pistol was fired, the axis of the transverse pin connecting the toggle links lay *below* the longitudinal axis of the barrel. Consequently, the pressure generated back through the cartridge case was directed downward into the receiver and the toggle could not open. Instead, the entire receiver assembly – including the barrel and the breechblock – began to slide back on rails milled in the frame. A few microseconds after the bullet left the barrel, the barrel/receiver unit hit a stop on the frame. The comparatively short rearward travel – only about 6mm – forced the toggle-grips upward against the prominent ramps on the rear of the pistol-frame. As the barrel/receiver unit stopped moving, the axis of the pin connecting the toggle-links was lifted above; the bore and residual momentum allowed the breechblock to reciprocate, loading a new cartridge into the breech on the forward stroke.

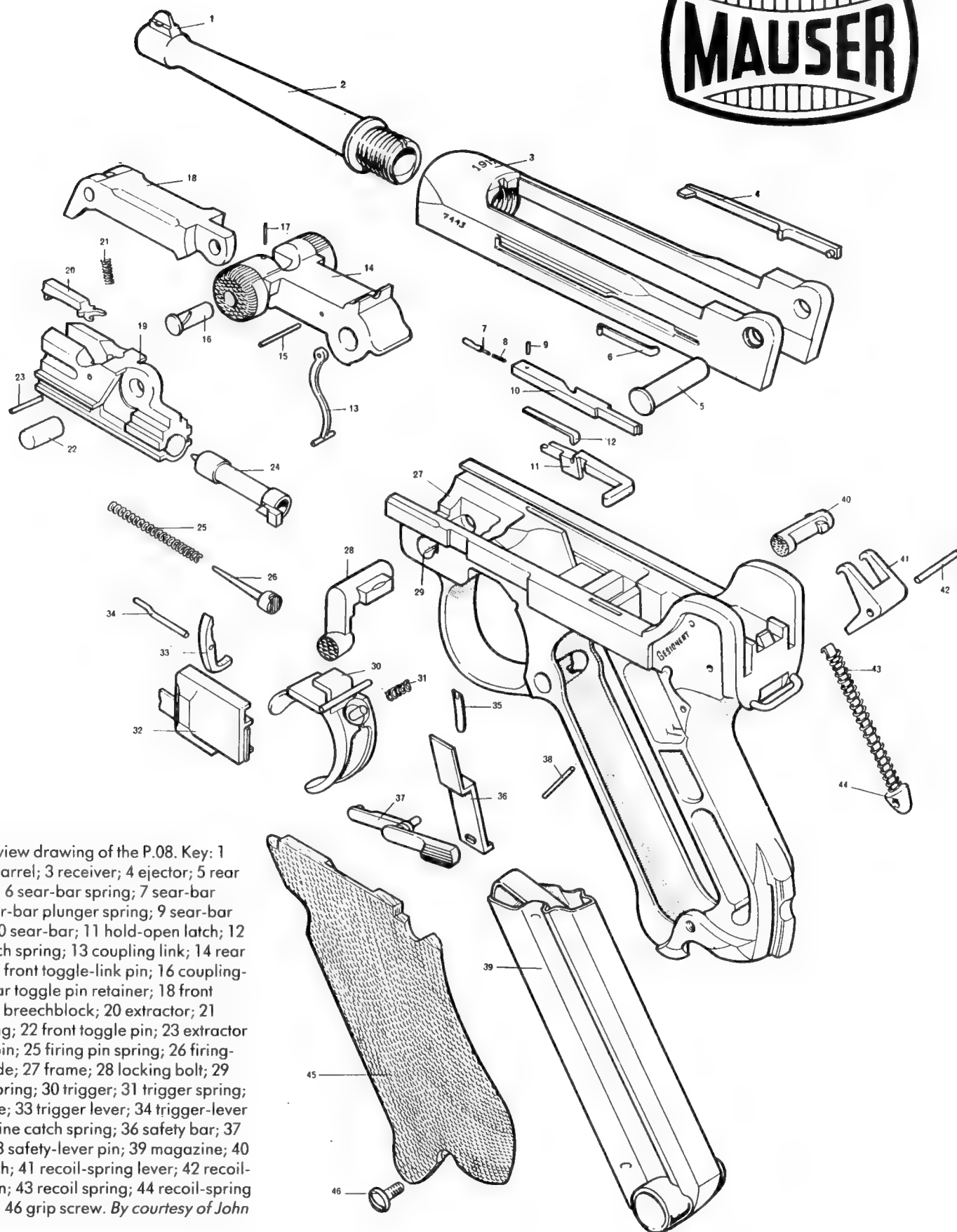
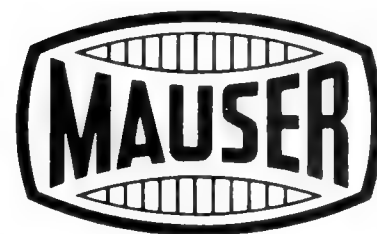
The Parabellum was a masterpiece of engineering physics, but notoriously awkward to machine accurately. Commercial examples were made by Deutsche Waffen- und Munitionsfabriken ('DWM') and its successor, Berlin-Karlsruher Industrie-Werk, until the production line was transferred from Berlin to the Mauser-Werke factory in Oberndorf am Neckar in



**48-52** ABOVE

The toggle and chamber-top markings of four typical Pistolen 1908. From top to bottom: an old DWM-made imperial gun with its chamber-date replaced by the '1920' permission mark; a 'G'-date gun (1935) with the 'S/42' maker's mark; the simplified '42'-marked pattern, with the full date above the chamber; and the last or 'byl' pattern with a two-digit date. *By courtesy of Masami Tokoi, Düsseldorf.*



**53 ABOVE**

An exploded-view drawing of the P.08. Key: 1 front sight; 2 barrel; 3 receiver; 4 ejector; 5 rear connector pin; 6 sear-bar spring; 7 sear-bar plunger; 8 sear-bar plunger spring; 9 sear-bar plunger pin; 10 sear-bar; 11 hold-open latch; 12 hold-open latch spring; 13 coupling link; 14 rear toggle link; 15 front toggle-link pin; 16 coupling-link pin; 17 rear toggle pin retainer; 18 front toggle link; 19 breechblock; 20 extractor; 21 extractor spring; 22 front toggle pin; 23 extractor pin; 24 firing pin; 25 firing pin spring; 26 firing-pin spring guide; 27 frame; 28 locking bolt; 29 locking-bolt spring; 30 trigger; 31 trigger spring; 32 trigger plate; 33 trigger lever; 34 trigger-lever pin; 35 magazine catch spring; 36 safety bar; 37 safety lever; 38 safety-lever pin; 39 magazine; 40 magazine catch; 41 recoil-spring lever; 42 recoil-spring lever pin; 43 recoil spring; 44 recoil-spring guide; 45 grip; 46 grip screw. *By courtesy of John Batchelor.*

1930. At this time, military guns were being refurbished by Simson & Co. of Suhl – nationalized in 1934 as ‘Berlin-Suhler-Werke’ and finally named ‘Gustloff-Werke’ – but whether Simson made any new guns is highly doubtful; though some ‘new’ pistols appeared in the late 1920s, they may simply have been made from pre-1918 components that had lain in store. Alternatively, they may incorporate new DWM-made components bearing Simson’s name to hoodwink the Inter-Allied Military Control Commission.

Refurbishment continued into the mid 1930s, much of it hidden from prying Allied eyes, until the advent of conscription on 16 March 1935 heralded overt militarism. The production of all smallarms was accelerated from 1 October 1935, the immediate goal being fivefold enlargement of the seven-division army! Mauser-Werke was supplying the army with as many Parabellums as it could make: by the end of 1935, monthly production was exceeding 10,000 guns.

As the Kriegsmarine’s needs were comparatively small, the navy authorities

simply waited for the army’s initial needs to be satisfied before acquiring additional Pistolen 08. The Luftwaffe, however, immediately negotiated a contract with Heinrich Krieghoff of Suhl. Krieghoff subsequently acquired the ageing ex-Erfurt equipment once owned by Simson & Co., by then nationalized by the NSDAP. However, appreciable machining differences suggest that very little of the original equipment was used by Krieghoff for anything other than to guide re-tooling.

Though the Krieghoff P.08 offered excellent quality, only a little over 13,000 were made between 1936 and the end of the Second World War. The company obtained a solitary 10,000-gun contract, after which the Luftwaffe was supplied by Mauser. To put the importance of Krieghoff into proper context, Mauser-Werke supplied the Oberkommando der Luftwaffe with appreciably more than 130,000 Pistolen 08 in 1939-42.

Mauser-Parabellums, all of which emanated from the Oberndorf factory<sup>1</sup>, initially bore a coded date in the form of ‘K’ (1934) or ‘G’ (1935) before the last

shackles of the Versailles Treaty were openly rejected. Thereafter, the guns were dated in full (‘1936’) and then with only the last two digits (e.g., ‘41’ for 1941). The manufacturer’s code was successively ‘S/42’, ‘42’ and ‘byf’. Between March 1939 and October 1942, 499,448 P.08 were supplied to the Wehrmacht – 359,247 to the army, 131,451 to the Luftwaffe and a mere 8,750 for the navy.<sup>2</sup>

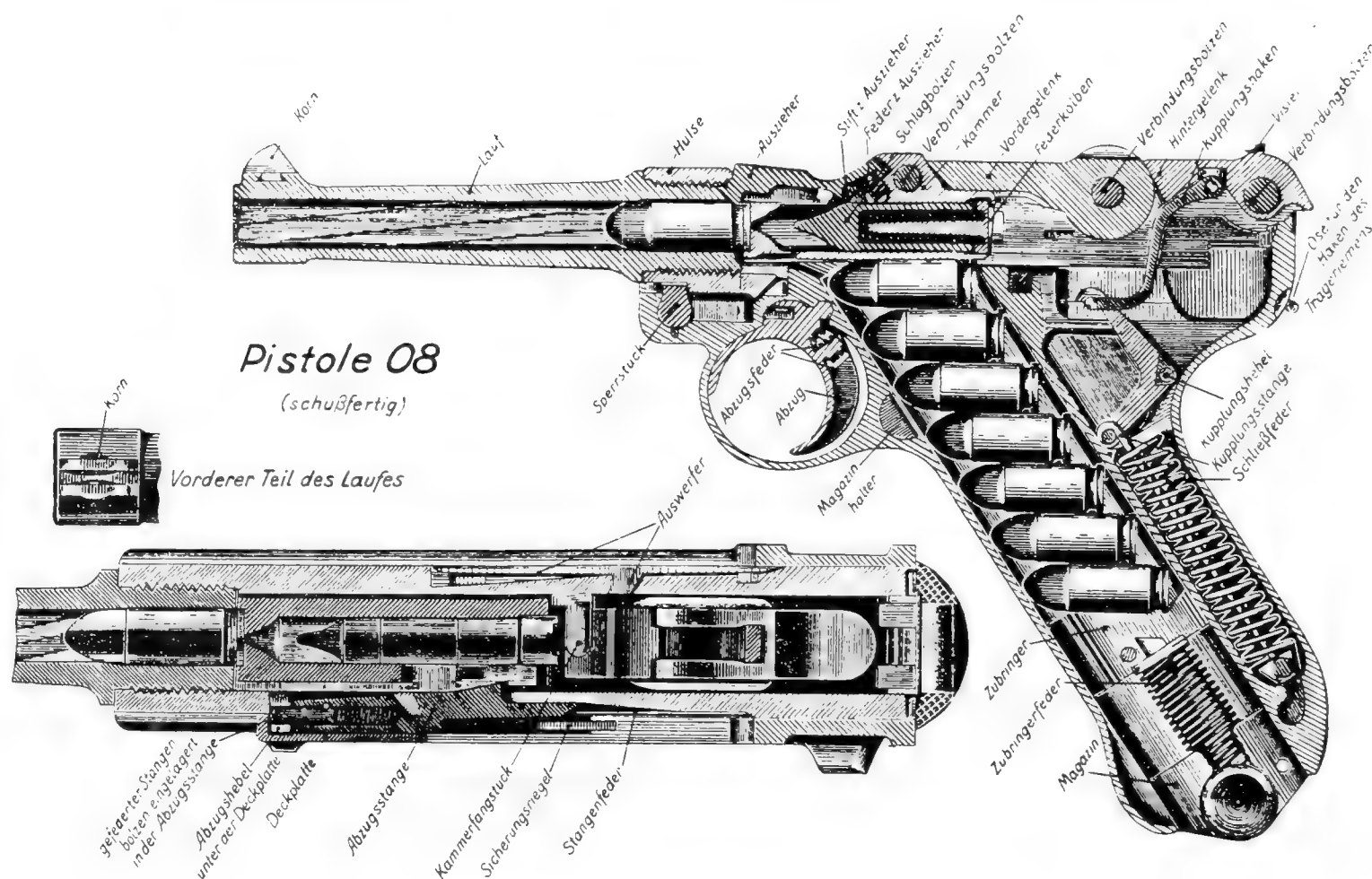
Mauser was officially ordered to cease making Parabellums in 1941, freeing additional manufacturing capacity for the P.38, but small numbers of the earlier gun were being assembled as late as 1945. Some of these were exported to friendly states – principally Bulgaria and Portugal

1. It is sometimes alleged that several thousand guns with ‘Kü’ marks – including some with Mauser components – were assembled in the Neuengamme detention camp in 1944-5. The case is not proven.

2. Including unconfirmed deliveries of up to 30,000 guns, owing to gaps in the surviving delivery schedules.

#### 54 BELOW

Wartime German sectional drawings of the P.08 mechanism. From Karl Fischer. *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.





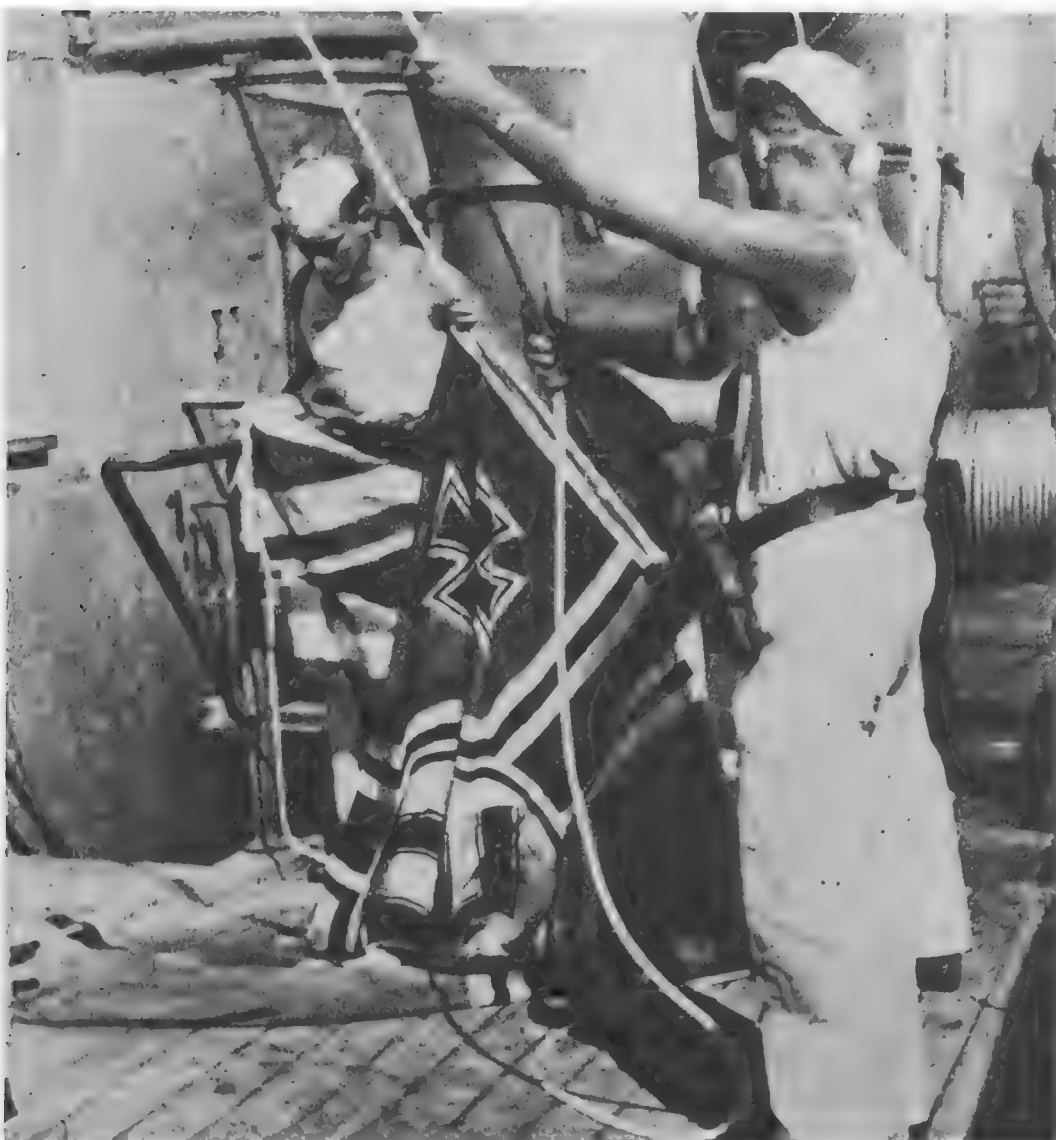
— while others went to police and paramilitary organisations; none went to the armed forces after October 1942. Total production in 1934-45 amounted to slightly more than one million Parabellums — including more than 31,000 for commercial sale, and nearly twelve thousand for agencies such as the Reichs-Finanz-Verwaltung and the police.

## THE WALTHERS

Though the Parabellum had a good reputation, particularly outside Germany, engineering studies undertaken by the Heereswaffenamt and others had always shown that the design — with its nineteenth-century origins — was much too complicated. Its exemplary accuracy excused neither excessive cost nor waste of raw material.

### 55, 56 LEFT

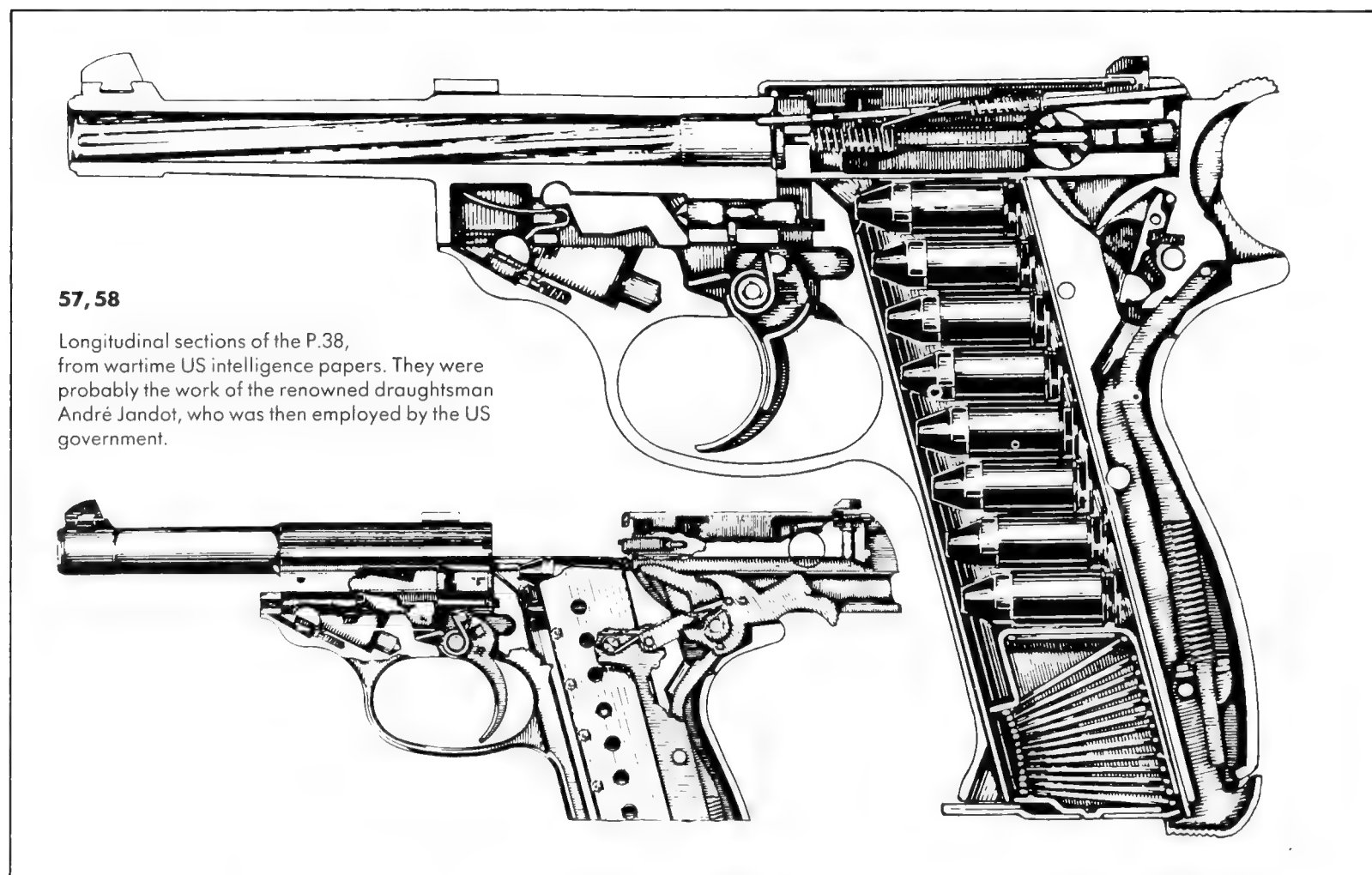
These 1940-vintage pictures show the boarding party from the German pocket battleship *Deutschland* seizing a British merchantman (top) and hoisting the German ensign (bottom). Note the P.08 holsters being carried on shoulder belts. By courtesy of Joachim Görtz.



Trials had been undertaken seriously even in Weimar days; by 1938, the enclosed-hammer Walther Armee-Pistole, which had been patented in Germany two years earlier, was performing well enough to overcome rivals promoted by Mauser-Werke and Berlin-Suhler-Werke. An exposed hammer was easily substituted for the enclosed pattern so heartily disliked by the HWaA, and Walther Heeres-Pistolen underwent exhaustive troop trials that stretched on into the campaigns leading up to the Second World War. Once the problems inevitable in any untried design had been corrected, the Walther was adopted as the Pistole 38 (P.38) on 26 April 1940.<sup>3</sup>

Like the Parabellum, the Walther was recoil operated. When the gun fired, the barrel and slide recoiled through about 7mm, securely locked together; the barrel was then stopped by a shoulder on the frame and an actuating pin pushed the

3. The designation often misleads modern writers into assuming that adoption occurred in 1938, in the simple-but-erroneous belief that designation-date, acceptance and introduction-to-service were identical. Not until the end of 1940, in fact, were there sufficient P.38 to permit wholesale issues.



57, 58

Longitudinal sections of the P.38, from wartime US intelligence papers. They were probably the work of the renowned draughtsman André Jandot, who was then employed by the US government.

locking block down to release the slide. The slide reciprocated alone, stripping a new cartridge into the breech as it returned. As the slide and barrel ran back to their original position, the locking block beneath the breech was forced up onto its plateau; concurrently, 'wings' on the locking-block engaged recesses in the slide-sides to lock the entire mechanism together. Ironically, though the Walther pistol is a simpler manufacturing proposition than the P.08, it remains complex. Walther's trigger was the first double-action pattern to be sturdy enough to withstand the rigours of active service, but contains a proliferation of levers, pins and springs.

The P.38 proved to be very successful; it was popular in German service and, like the Parabellum, was much prized by Allied servicemen. But while the P.08 was sought simply as a souvenir, the P.38 was valued as a combat weapon.

British Army revolvers could not offer the same rate of fire, whereas the US Colt-Browning lacked the double-action trigger that could fire the first shot so much

faster than a conventional single-action automatic. It is usually much too dangerous to carry single-action guns with the hammer down on a loaded chamber; the slide has to be retracted manually before the first shot can be fired.

The authorities soon realised that P.38 would be required in such great numbers that Walther would never cope alone, even though approximately 590,000 were delivered to the Wehrmacht in 1939-45. The army inventory in September 1940 had stood at 552,962 pistols (almost all P.08), with an additional 186,000 P.08 serving the Luftwaffe and nearly 36,000 assorted pistols – P.08 and Mauser blow-backs – in the Kriegsmarine. By August 1944, the total army inventory had risen to 1,600,000 despite stupendous losses: 12,381 pistols in December 1943, rising to 52,090 in July 1944 alone. By the end of the war, the army had purchased more than three million pistols since the beginning of 1939.

Though it is popularly believed that Mauser-Werke was the second contractor to deliver P.38 to the armed

#### 59 ABOVE RIGHT

The P.38 dismantled into its principal components: 1, barrel and barrel block; 2, locking piece; 3, slide; 4, frame; 5, grips and grip bolt; and 6, magazine. Note the position of the twin recoil springs along the upper edge of the frame. *By courtesy of Ian Hogg.*

#### 60 RIGHT

A typical Walther-made P.38, no. 5442e of 1941. Note the manufacturer's 'ac' code on the slide. *By courtesy of Warren H. Buxton.*

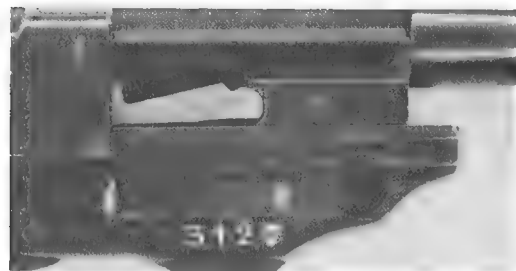
forces, the honour actually fell to Spreewerke GmbH of Spandau. Spreewerke, better known for field-guns and howitzers, was impressed into the production of Walther-type pistols in 1941 and delivered the first fifty in May 1942; 7,050 had been accepted by New Year's Day 1943. The company ultimately achieved the highest production, but only at the expense of quality. Total production amounted to about 275,000 P.38, mostly displaying 'cyq'. However, a few received what appears to be 'cvq', caused by the 'y' tail breaking away from the die unnoticed. Some – if not all – of Spreewerke's pistol production was undertaken in a





**61 RIGHT**

This Spreewerke-made P.38, no.2978x, dates from the end of 1944. Note how the quality has declined compared with the older Walther gun shown previously. Note also that 'cyq' code appears on the slide rather than 'ac'. *By courtesy of Warren H. Buxton.*

**62 ABOVE**

A detail view of the Walther locking block, seen here on a commercial Heeres-Pistole. 'Eagle/N' proofmarks grace most of the components. *By courtesy of Joseph J. Schroeder.*



subsidiary plant at Grottau-Zittau (now Hradkou in northern Czechoslovakia), where 3,000 guns were assembled for the Czech army in 1945-6. This may also explain why the Spreewerke guns contain so many components made by Czechoslovakian subcontractors.

Mausser-Werke was ordered to stop producing the P.08 in 1941, though assembly continued well into the following year. The HWaA was so confident that supply of pistols would exceed demand that last batches of P.08 were exported to Bulgaria and Portugal. The first 700 Mauser-made Pistolen 38 were delivered in December 1942 and work continued until the arrival of the French in April 1945: more than 308,000 had been made in several recognizably-differing subvarieties. Mauser products displayed the code-group 'byf' until the beginning of 1945, when the appearance of 'svw' may indicate dispersal of P.38 production elsewhere in southern Württemberg.

## THE MAUSER C/96

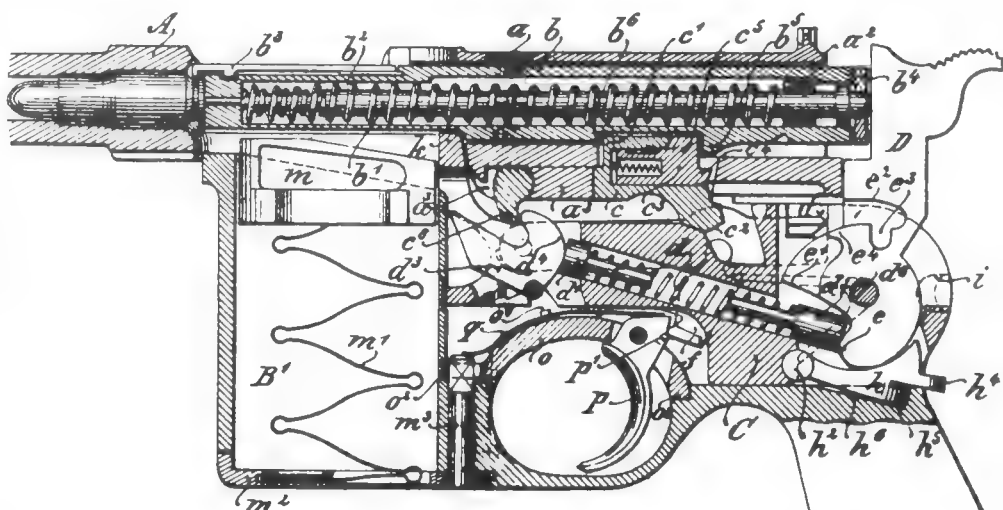
This was another nineteenth-century design, ironically making use of the cartridge originally designed by Borchardt – inventor of the Parabellum's immediate predecessor. An elegantly engineered gun, though externally somewhat clumsy, the Mauser C/96 embodied

a recoil-operated action locked by a rising block beneath the breech-bolt. It could not be mistaken for anything other than a Mauser (apart from a Spanish copy), as it had a distinctive integral charger-loaded magazine immediately ahead of the trigger aperture.

After an uncertain start, and an unwanted reputation for persistent jamming, the C/96 had been developed into a powerful battle-worthy weapon let down only by its clumsiness. It even made a passable light semi-automatic carbine

with its convertible wooden holster/shoulder stock attached. Large numbers of 9mm C/96 were purchased by the army during the First World War, chambered for the regulation 9mm Parabellum cartridge, and many guns – 7.63mm and 9mm alike – survived to serve the Reichsmarine and Weimar-period police.

By 1930 the standard 7.63mm-calibre C/96 offered walnut grips with twelve lateral grooves, a 50m-1,000m tangent-leaf sight atop the receiver and a ten-round magazine. Small quantities were also

**63**

A longitudinal section of the original C/96 pistol, from the drawings accompanying the earliest British patent of 1895. *By courtesy of the Patent Office, London; reproduced by permission of Her Majesty's Stationery Office, Crown Copyright.*

being made for the 9mm Mauser Export round, which was perceptibly more powerful than the 9mm Pist.Patr.08 and proved the durability of the basic Mauser design. Most post-1930 guns had a small ring hammer; and the so-called Universal Safety, protruding from the rear left side of the frame, allowed the hammer to drop safely onto a loaded chamber by blocking the firing pin.

The Mauser was especially popular in Spain, where copies were made under the Astra, Azul and Royal brandnames. The Astras were by far the best finished of these, even though their material was sometimes soft; during the Second World War, several thousand Astras were acquired to supplement the Wehrmacht's genuine C/96.

During the 1920s, the Spanish manufacturers attempted to transform their Mauser copies into light fully-automatic carbines, a role to which the comparatively lightweight pistol was unsuited. Excessively high cyclic rates exhaust the magazines in a fraction of a second; and the guns become impossible to control.

Despite these important shortcomings, sales of the fully-automatic guns were sufficiently buoyant to persuade Mauser to copy the Spanish lead. Prototypes of

the 1931-patent Nickl C/96 Schnellfeuerpistole appeared in 1932, but the perfected model was the work of Karl Westinger. His master patent was sought in 1933, but not granted for several years. Though basically identical to the standard C/96, the Schnellfeuerpistole had a detachable twenty-round box magazine and a selector switch on the left side of the frame immediately above the grip/trigger guard joint. This rotated to 'N' for single shots and 'R' for fully-automatic operation. The guns were generally sold with wood holster/stocks, supported in a leather harness.

The Westinger-patent Mauser Schnellfeuerpistolen, introduced commercially in 1936, were popular in the Far East in addition to Central and South America. Wehrmacht purchases may have been limited to 7,800 guns purchased in 1940 for Luftwaffe Flakabteilung motorcyclists.

In addition to the Mausers, 1,004 Spanish Astra Mo.903 machine-pistols were delivered to the German authorities in Hendaye, France, in November 1940. A second consignment of 1,000 followed in March 1943, accompanied by 1,050 standard Astra Mo.900. These guns, the best of the Spanish Mauser copies, deviated internally from their German prototypes.

For example, the Astra locking block was pinned to the barrel extension – unlike the free-floating Mauser pattern – and a unique flat-surface detachable sideplate gained access to the lock components. 'Astra-Mausers' purchased on behalf of the HWaA bore nothing other than standard Spanish markings and could only be identified by their serial numbers.

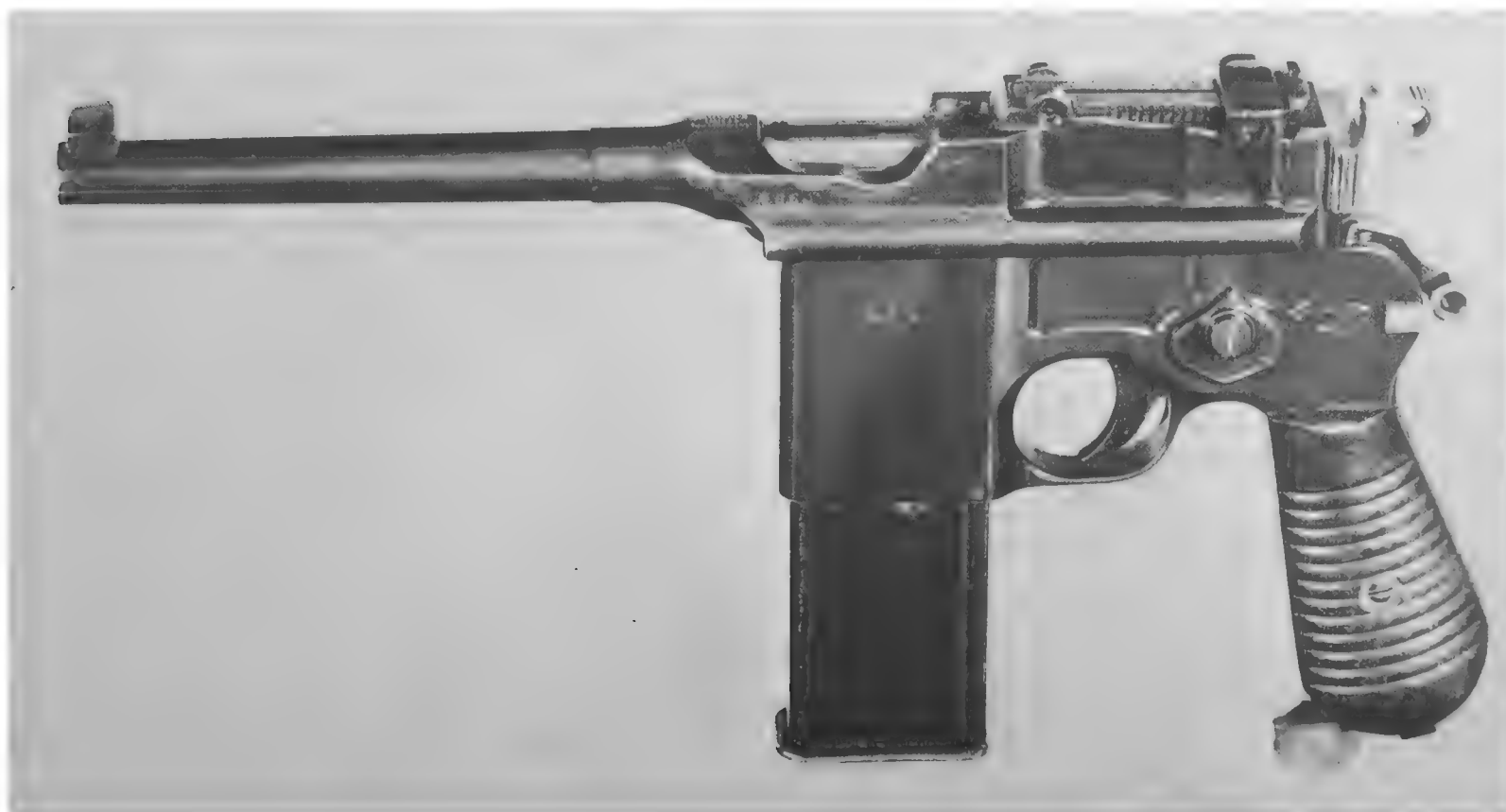
## THE GERMAN BLOWBACKS

P.08 and P.38 were generally sent to front-line troops, particularly after reverses in Russia and North Africa forced the Germans into an increasingly defensive campaign. However, there were many servicemen, paramilitary-organization members and policemen who also needed a handgun.

A law forbidding the private ownership of firearms had been passed in 1938, and all such guns had been surrendered to the authorities. Many were given to the

### 64 BELOW

A Westinger-patent Mauser Schnellfeuerpistole. Note the selector on the left side of the frame behind the trigger, the stepped barrel and the detachable box magazine. *Author's archives.*



armed forces and the police, and even some of the oddest – such as the Belgian Armand Gavage – may now be found with post-1940 German proof marks.

Though the police had appreciable numbers of Pistolen 08, many had passed into the hands of the army when the Landespolizei had been absorbed in August 1935. And though occasional deliveries of P.08 and P.38 were made in 1943-5, quantities were minuscule. As a result, the police and the paramilitary (together with officers in the armed forces) relied on small blowbacks and captured equipment. In the period 1939-42, the Wehrmacht alone took 140,427 Walther, Mauser and Sauer blowbacks.

#### 65 RIGHT

This pre-war Walther PPK was used by the police forces in München. The mark 'PDM' signifies Polizei-Direktion München – 'Munich police service'. By courtesy of Joseph J. Schroeder.

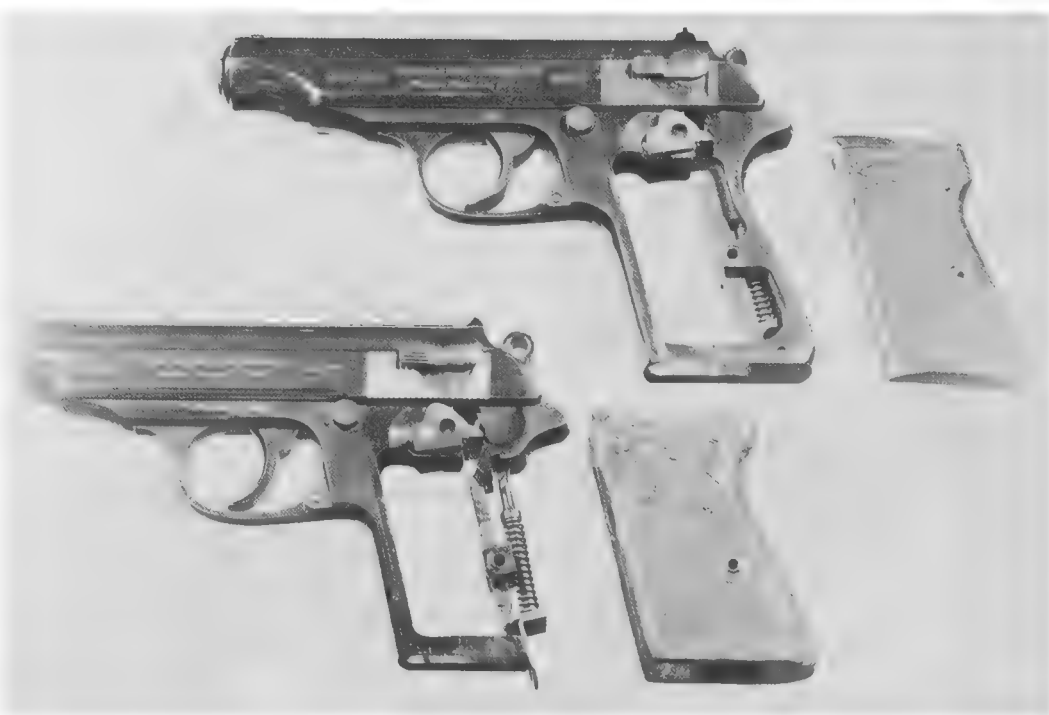
#### 66 RIGHT

Apart from differing size, the grips and frame of the Walther PP (top) and PPK (bottom) were also most distinctive. The PP has a solid back strap and two separate grips, while its diminutive has an open back strap and a once-piece wrap-around grip. By courtesy of Ian Hogg.

The most important of these were the Walthers, the Polizei-Pistole or 'PP' and the shorter Kriminalpolizei-Pistole ('PPK'), patented in 1929 and introduced commercially in 1930-2. They were known to the police as 'Walther-Pistole PP' and 'Walther-Pistole PPK' respectively, generally abbreviated as 'P.W.PP.' and 'P.W.PPK'. The PPK had also been officially adopted by the Sturm-Abteilung as the 'Ehrenwaffe des politischen Leiters' in 1936. Total procurement for the Wehrmacht and the police is estimated as about 100,000 PP and 72,000 PPK, but many others were purchased by the paramilitary.

The Walthers were the first personal-defence guns to incorporate an effectual double-action trigger system, allowing them to be carried in perfect safety even though a live round had been chambered. This was rarely practicable in single-action designs and, consequently, a great sales asset on which Walther swiftly capitalized.

This success forced Walther's leading rivals, Mauser-Werke of Oberndorf and

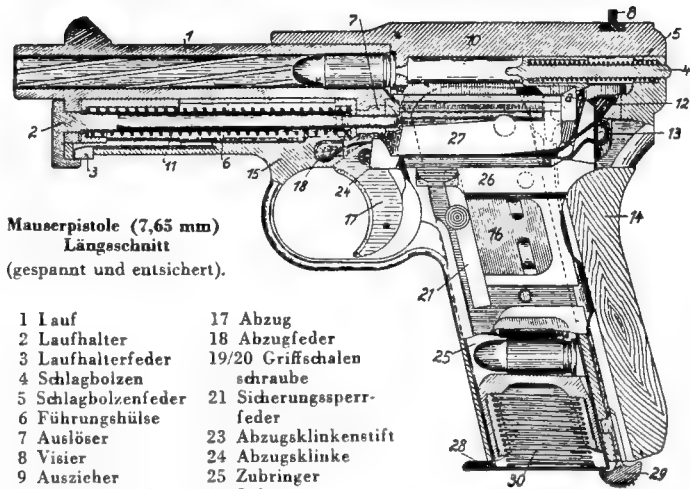


Sauer & Sohn of Suhl, to develop competitive designs. The standard Mauser personal-defence pistol in the mid 1930s was the Modell 1934, a conventional single-action blowback developed from the original Modell 1914. Known to the police as the 'Pistole Mauser' (or simply 'P.M.'), it had a lengthy pedigree but little to commend it other than good quality; consequently, procurement was minimal – possibly 8,000 for the Wehrmacht, 4,500 for the police and an unknown quantity for the paramilitary. Sauer offered the

standard Modell 1913 ('Pistole Sauer & Sohn' or 'P.S. & S.') and the cosmetically improved Behörden-Modell ('P.S. & S.B.M.'), 7.65mm blowbacks with origins early in the twentieth century. Like the Mauser M34, the single-action 7.65mm Sauer's were well-made and effectual enough, but lacked stopping power.

In the late 1930s, after a series of false starts, Mauser perfected the HSc (Hahn-Selbstlade-pistole, Modell C, or 'third pattern self-loading pistol with hammer'). Known to the police as the 'Mauser-Pis-





**Mauserpistole (7,65 mm)**  
**Längsschnitt**  
(gespannt und entschert).

- |                     |                       |
|---------------------|-----------------------|
| 1 Lauf              | 17 Abzug              |
| 2 Laufhalter        | 18 Abzugfeder         |
| 3 Laufhalterfeder   | 19/20 Griffschalen    |
| 4 Schlagbolzen      | schraube              |
| 5 Schlagbolzenfeder | 21 Sicherungssperre-  |
| 6 Führungshülse     | feder                 |
| 7 Auslöser          | 23 Abzugsklinkenstift |
| 8 Visier            | 24 Abzugsklinke       |
| 9 Auszieher         | 25 Zubringer          |
| 10 Verschlussstück  | 26 Sicherung          |
| 11 Vorhofeder       | 27 Abzugsstollenhebel |
| 12 Auswerfer        | 28 Magazinboden       |
| 13 Doppelfeder      | 29 Magazinhalter      |
| 14 Griffschale      | 30 Zubringerfeder     |
| 15 Griffkasten      | 31 Deckplatte         |
| 16 Magazingeäuse    |                       |

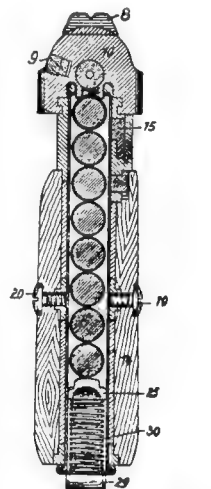
- a) Abgesetzte Kante des Abzugsstollenhebel (27).  
b) Nase des Schlagbolzens.  
c) Stoßboden.  
d) Teil des Auslösers (7), der in die Laufbahn (Kammerbahn) tritt.  
e) Sicherungsebel.  
f) Drehpunkt des Sicherungsebel (stücker).  
h) Knopf der Sicherungssperrefeder (21).  
i) Fenster zum Auswerfen der Hülse.

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Bilder  
nechste  
Seiten



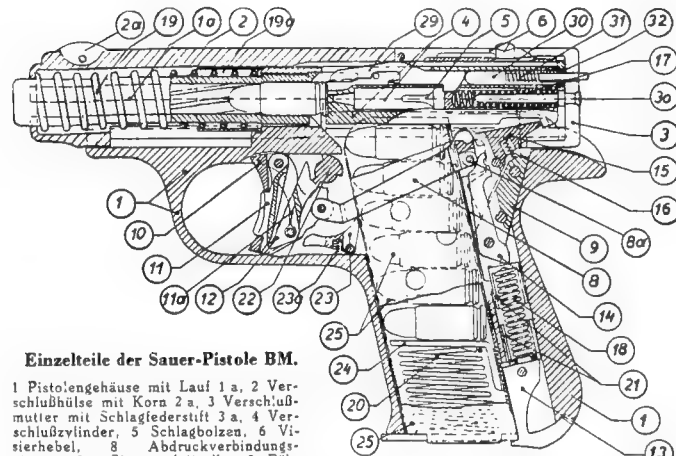
= Fenster.

□ Verschlussstück nach dem Abfeuern  
in hinterster Stellung.



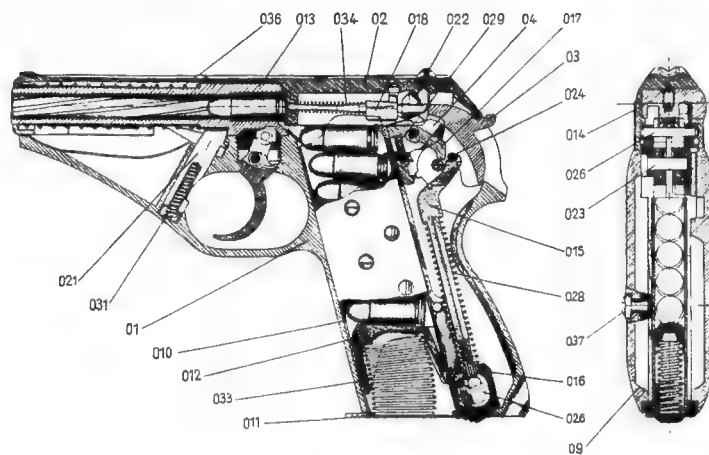
Querschnitt durch Verschluss  
und Griffstück  
(von vorn gesehen).

iii



**Einzelteile der Sauer-Pistole BM.**

1 Pistolengehäuse mit Lauf 1 a, 2 Verschluss-  
hülse mit Korn 2 a, 3 Verschluss-  
mutter mit Schlagfederstift 3 a, 4 Ver-  
schlußzylinder, 5 Schlagbolzen, 6 Vi-  
sierhebel, 8 Abdruckverbindungs-  
stange, 8 a Stangengleitrolle, 9 Füh-  
rungsstückchen, 10 Abzug, 11 Sicher-  
ungsauslösehebel, 11 a Spreizfeder für Sicherungsauslösehebel, 11, 12 Stützhebel,  
13 Magazinhaltehebel, 14 Steuerhebel, 15 Abzugsstollen, 16 Abzugsstollenfeder, 17 Schlag-  
feder, 18 Feder für Steuerhebel und Magazinhaltehebel, 19 Schließfeder, 19 a Schließfeder-  
hülse, 20 Zubringerfeder, 21 Zwei Federhülsen für Feder 18, 22 Sicherungsebel mit  
Haltenase für die Verschlusshülse, 22 b Sicherungsfeder, 23 Magazin-  
sicherungswinkel, 23 a Patroneauschlaghebel, 30 Signalstift, 31 Signalstiftfeder, 32 Signal-  
stiftführungsmutter.



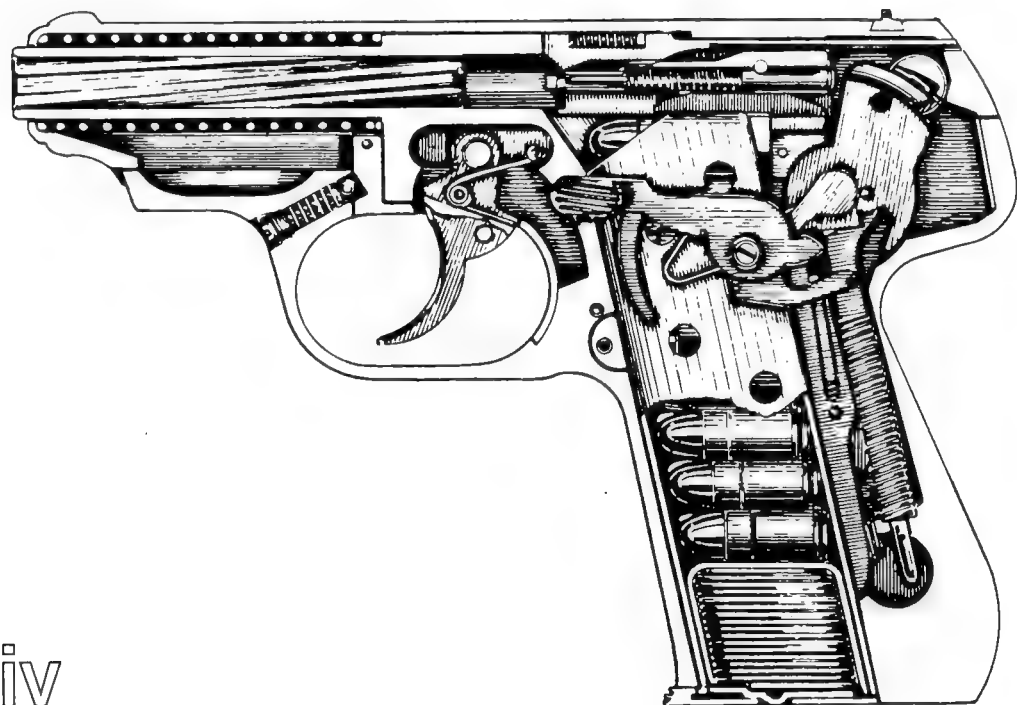
ii

### 67-70 ABOVE AND LEFT

Sectional drawings of the Mauser M34 (ii),  
Mauser HSc (ii), Sauer Behörden-Modell (iii) and  
38H (iv) blowback pistols, from Fischer's *Waffen-  
und Schiesstechnischer Leitfaden für die  
Ordnungspolizei*, 1943. They originally came  
from the manufacturers' manuals.

tole neuer Art' or 'P.M.n.A.', this presented  
a more streamlined appearance than the  
Walthers, a double-action trigger system  
and comparable safety arrangements.  
Interestingly, military procurement of the  
HSc never reached the heights of the  
Walther and Sauer guns; it is suspected  
that the bulk of the guns went to the  
police (perhaps 22,500 of them) and the  
paramilitary.

The Sauer & Sohn M38 double-action  
personal-defence pistol ('P.S. & S. M38'),  
which appeared contemporaneously with  
the Second World War, had an internal  
hammer and a separate cocking lever  
protruding from the left grip immediately  
behind the trigger aperture. It proved ef-  
fectual and popular, even though manu-



iv

facturing quality declined greatly as the war progressed. Purchases are variously estimated as about 50,000 for the Wehrmacht and 70,000 for the police, but much larger quantities clearly went to the paramilitary.

# **71, 72 BELOW AND RIGHT**

Naval marked Mauser M14 (71) and M34 (72) pistols. The former bears a Reichsmarine mark and a '1920' permission-stamp on the slide, while the latter displays a large 'eagle/M' on the frame. *Courtesy of Tom Knox; photograph by Rod Stout.*

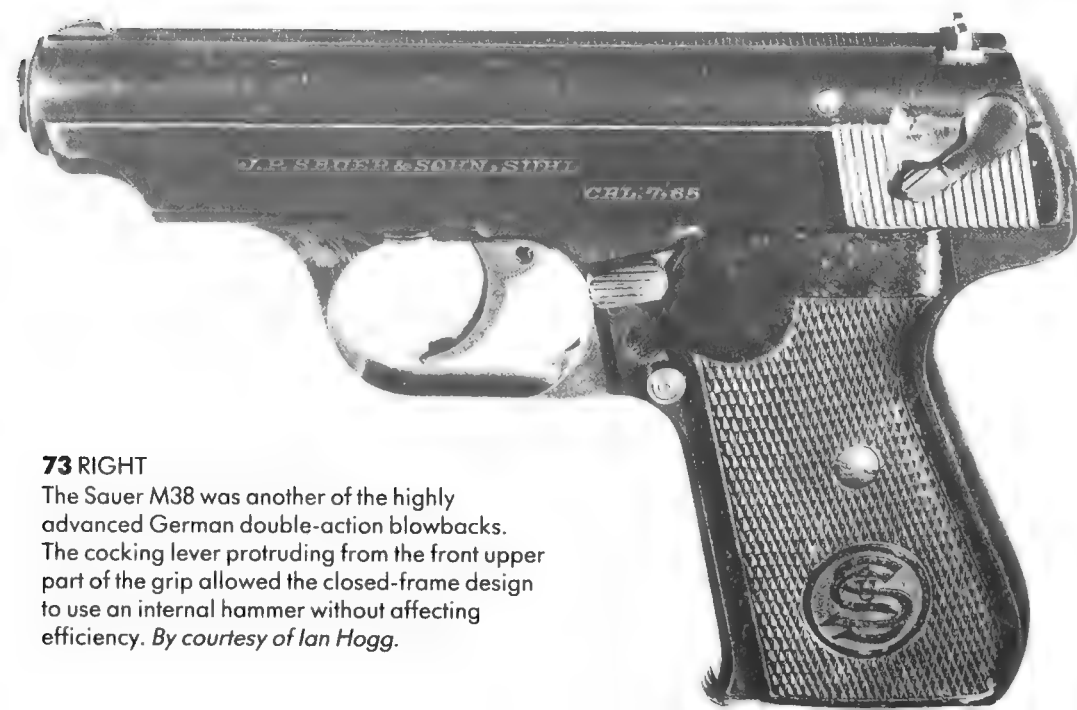


# **74 ABOVE**

The HSc was Mauser's answer to the Walther Polizei-Pistole. Its notably elegant lines are evident in this view, though this particular gun has an experimental stamped slide intended to simplify production. *Courtesy of Dr Rolf Gminder.*

# **73 RIGHT**

The Sauer M38 was another of the highly advanced German double-action blowbacks. The cocking lever protruding from the front upper part of the grip allowed the closed-frame design to use an internal hammer without affecting efficiency. *By courtesy of Ian Hogg.*



## THE VOLKSPISTOLEN

As the tide of war turned against Germany, losses of equipment reached such colossal proportions that the arms industry simply could not cope with demands made on it. By mid-1942, the authorities were already seeking not only simplified designs but also specialists in advanced production techniques with no previous relevance to gunmaking; for the first time, traditional methods were to be eschewed in favour of metal-stamping, welding and other mass-production techniques. The goals were reduced complexity, increased output and less wastage of raw material.

The first lessons were applied to comparatively conventional weapons, leading from designs such as the Kar.98k 'Kriegsmodell' and MG.42 to the MP.43. But these were all conventional weapons, designed for mass production but never-

theless durable, sophisticated and still relatively expensive. The second stage was to be the Volkswaffen or "People's Guns", in which even design was subordinated to ease of production. Identification of the pistols involved in this process is hindered by lack of information, though what had begun with the P.38 was clearly to finish with hideous (but potentially no less effectual) sheet-steel blowbacks.

Mausers's so-called 'Gerät 40' pre-dates a visit by senior Wa-Prüf officials to the Oberndorf factory in June 1943, but only drawings and a wooden model had been made. Originated sometime in 1942, when the code M.7057 had been allotted, the first prototype was not readied until February 1944 and a second in June. The project crystallized into a simple sheet-steel pistol with a tipping barrel locked by camming a transverse channel upward into a sturdy crimped shoulder in the slide. M.7057 had a double-action trigger with an exposed hammer spur and a radial safety high on the left side of the slide

above the ribbed pressed-metal grips. Two single-strand wire recoil springs in the butt, one each side of the magazine, were the ultimate expression of the patent granted to Mauser engineers Altenburger & Seidel in 1938 (DRP 717,799). However, M.7057 failed to elicit official backing and was abandoned in January 1945; nothing had been done since October 1944.

The Mauser Volkspistole apparently bore the internal development code V.7082. It was originally a double-action striker-fired blowback, made from heavy-gauge steel pressings, and had been completed by October 1944. It was tested by Wa-Prüf 2 in November, against a double-action Walther blowback, but a hold-open and a lanyard ring were requested and the guns returned to their

### 75 BELOW

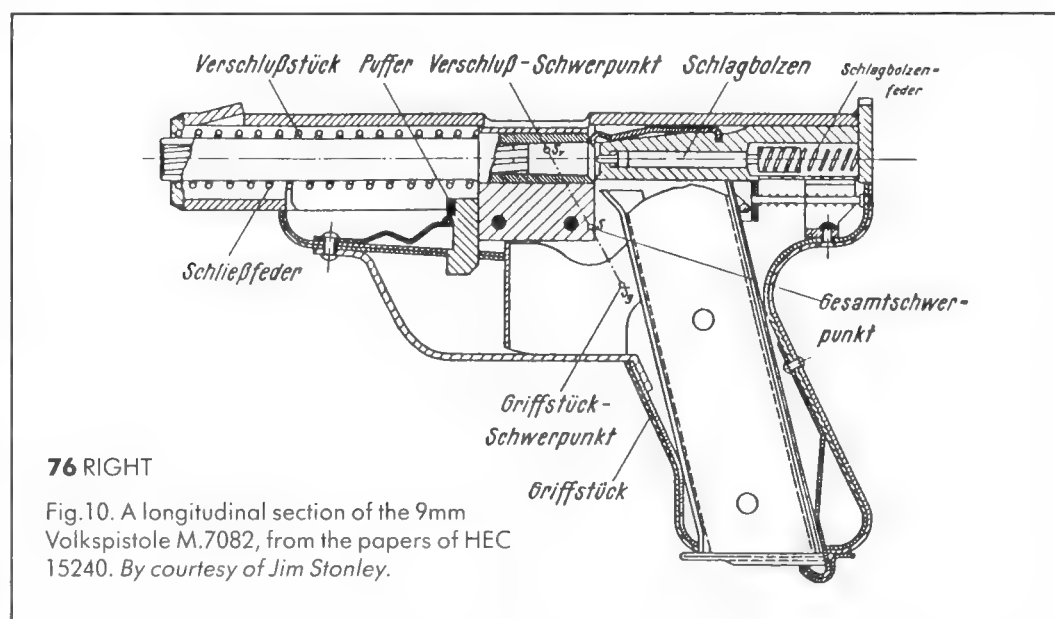
One of the few surviving Walther Volkspistolen is this 1945-vintage single-action 9mm blowback, no.14. *By courtesy of Henk Visser.*



promoters. Trials undertaken at Döberitz in December 1944 then led to the rejection of the double-action trigger systems and a request that, if possible, a breech-opening delay should be incorporated. A single-action blowback was the immediate result, though factory trials were being conducted simultaneously with fluted chambers and 'gas pockets' to delay the initial rearward movement of the breech.

Previously often attributed to Gustloff-Werke, one surviving modified V.7082 features a unique gas-bleed delay in which part of the gas propelling the bullet seeps through ports in the barrel to impinge on the inner surfaces of the slide. This helps to keep the breech shut until residual chamber pressure decays to a safe level. One V.7082 with such a delay, plus a lead buffer version, was tested against a conventional double-action blowback numbered 'V.102' at Oberndorf on 20 January 1945.

Walther's first projects included a 9mm pistol with a rotating-barrel lock adapted from the Austrian Steyr-Pistole M 12, plus a blowback sharing an essentially similar frame. Though made largely of stampings, the surprisingly good finish, attention to detail in the small parts and the quality of the blueing suggest pre-1944 origins. It is assumed that the rotating-barrel gun competed against the M.7057 Mauser design. A variant of the



76 RIGHT

Fig.10. A longitudinal section of the 9mm Volkspistole M.7082, from the papers of HEC 15240. By courtesy of Jim Stanley.

P.38 with a lengthened frame and a full-length stamped-sheet slide may also date from this period. The surviving specimen actually bears 'No.2' beneath a small Walther banner, but the identity of 'No.1' (unless it is the rotating barrel gun) remains to be determined.

Walther then proceeded to much cruder sheet-steel guns, including a greatly simplified version of the service P.38 – sometimes identified as the *original* pistol prototype – and a single-action blowback. The locked-breech gun, incorporating a radical revision of the Barthelmes lock found in the P.38, is made largely of sturdy pressings. It is

suspected that it dates from the later period of the Volkspistole, probably the autumn or winter of 1944.

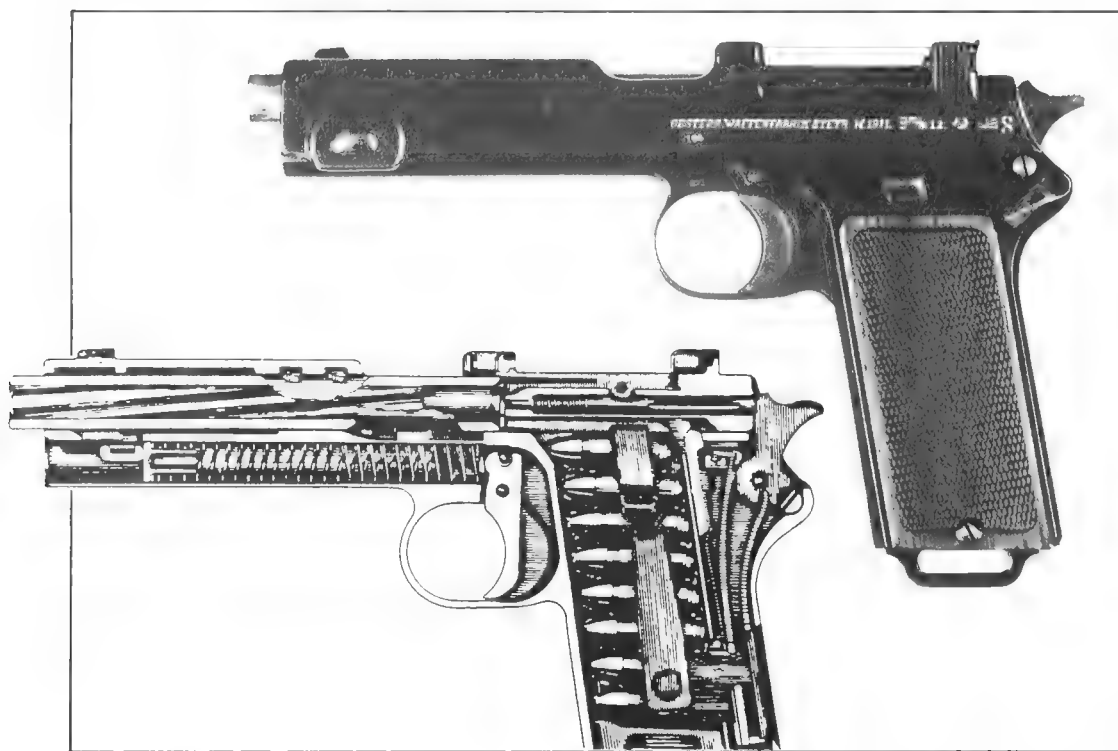
The oldest Walther blowback offers comparatively good quality, double-action, wood grips, blued finish and acceptable attention to detail. It is assumed to be the pattern tested against Mauser's original double-action V.7082 in November 1944; as the Walther offers much better quality than the Mauser, it would have been more expensive and time-consuming to produce – precisely the opinion offered in surviving documents. This gun was probably followed by a simplified double-action pattern in December 1944 and, finally, by the well-known single-action type that must date from early 1945.

Gustloff-Werke's participation in the simplified pistol and Volkspistole projects is confirmed by surviving Mauser documents, though no guns have yet been identified. There were also three simple revolver designs submitted by Mauser, Deutsche-Werke and Böhmisches Waffenfabrik.

As huge requirements for handguns could not be satisfied by indigenous production, the authorities cast around for other supplies. The most obvious source was the annexed territories.

77,78 LEFT

The Steyr-Pistole M 12, or Steyr-Hahn, was reissued to police and reserve units in Ostmark (sequestered Austria). This commercial-pattern gun was made before the First World War. Author's archives.





# Captured guns

## AUSTRIAN GUNS

The seizure of Austria in 1938 permitted much of the Austrian army to be absorbed into the Wehrmacht. Though the front-line units were speedily re-armed with German weapons, Austrian patterns remained in the hands of second-line and reserve units.

The most important pistol was the 9mm-calibre Steyr-Pistole M 12, an interesting recoil-operated rotating-barrel design developed by Österreichische Waffenfabriks-Gesellschaft<sup>4</sup> from the Repetierpistole M 7 ('Roth-Steyr') and adopted by Romania shortly before the First World War. When hostilities began in 1914, the M 12 was successfully impressed into Austrian service and vast numbers had been made prior to the Armistice. Small quantities had even been purchased by the Bavarian army in 1916-18 to eke out supplies of the P.08.

M 12 pistols still equipped the Austrian forces in 1938. The Germans initially used them with the standard Austrian 9mm cartridges, which were longer than the Pist.Patr.08 and could not be interchanged. As ammunition supplies ran short, however, selected M 12 pistols were converted for the 9mm Pist.Patr.08 under the designation M 12 umg. (umgeändert, 'modified'). A distinguishing '08' was struck into the left side of the slide. Virtually all the 60,000-plus survivors found their way into police hands, particularly in the provinces of Ostmark and Böhmen-Mähren.

The charger-loaded Steyr M 12 pistols could not be confused with any others, as their butts were virtually perpendicular to the bore. The Steyr-Pistole M 34 was a less impressive product. Chambering the popular-if-ineffectual 7.65mm Auto cartridge, it was based on a Warnant-Pieper blowback design dating back to 1905. The tipping barrel facilitated cleaning, but also permitted single shots to be fired manually. Until the chaotic days of



79, 80 ABOVE AND RIGHT

Pistols seized in Czechoslovakia included the vz.24 and the quirky Myška-designed vz.38  
*Author's archives.*

1944-5, the M 34 was restricted to what had become the Ostmark region of Greater Germany.

## CZECH GUNS

Between the wars, Czechoslovakia had encouraged the indigenous arms industry based around the town of Brno, where Zbrojovka Brno and Československá Zbrojovka had created a healthy export market. The impressive Mauser-type rifles and ZB machine-guns are described in the relevant chapters, but the efficacy of the longarms was not shared by the pistols. The first indigenous guns had been the vz/22 and vz/24, recoil-operated and locked by rotating the barrel into engagement with the slide; however, these guns had proved to be temperamental and too complicated even though the vz/24 remained the standard service

weapon for some years. Production was approaching 200,000 when work stopped in 1938, and many guns survived to be seized by the Germans – some even being assembled from the copious stocks of unsued components. They were all known as Pistolen 24(t) in Wehrmacht service.

Shortly before the German invasion of Czechoslovakia, the vz/24 had been replaced by the quirky ČZ vz/38, designed by Frantisek Myška. This gun contained a conventional 9mm blowback action in a far-from-conventional exterior, and had a double-action trigger with a particularly knuckle-whitening pull. The first 41,000 guns had all been completed before the Germans seized Československá Zbrojovka, but the basic design had so very little to offer that only a few additional guns were assembled from existing components. All but three thousand guns retained for the Kriegsmarine went straight to the army as the Pistole 39(t).

4. Later Steyr-Daimler-Puch AG.

If the vz/38 was undesirable, the vz/27 police/paramilitary blowback derived from the vz/24 was held in much greater esteem. Production continued under German supervision, 105,500 being acquired in 1939-42 alone. Many of the guns were used by the army as Pistolen 27(t), while others went to the police as 'Pistolen Modell 27' ('P.M.27'). About 16,000 guns had been made prior to 1939, and 5,000 were assembled from existing parts under HWaA supervision; these all had standard ČZ marks. The factory was then renamed 'Böhmische Waffenfabrik', the marking dies changed and production resumed until the 'fnh' code was approved in June. Most of the 465,000 pistols made during the German occupation went to the army, though small quantities were supplied to the Luftwaffe and police.

## POLISH GUNS

Though the pistols acquired in Czechoslovakia had been disappointing, Poland was a better prospect. The Polish army had had a particularly traumatic 1920s, when a licence to build Russian Nagant gas-seal revolvers had been acquired and a decision to build the Czech vz/24 was only narrowly averted. Finally, however, Wilniewicz and Skrzypinski had perfected a locked-breech Colt-Browning variant chambering the standard 9mm Parabellum cartridge. Officially known as the 'VIS wz.35', this most effectual weapon remained in production throughout the war, even though the design was simplified and quality declined appreciably as the Russians drew inexorably nearer Fabryka Bronie w Radomiu.

The first deliveries of the Pistolet 35(p) – excepting those that had simply been seized – were made in 1941. By the end of 1942, nearly 74,000 had been delivered to the army and 10,500 to the Kriegsmarine. German-controlled production totalled about 289,000 guns in three differing patterns; the earliest had a high-polish finish and a stock-slot on the butt; the second had a military-grade finish and lacked the slot; while the last and worst type, generally lacking the dismantling catch, often displayed wood grips, riveted-in lockwork and poor finish.



The Radom factory was evacuated in January 1945, whereupon many tons of components were sent to Steyr-Daimler-Puch – where approximately 22,000 poor-quality guns were assembled from a mixture of Steyr and Radom parts in 1945.

### 81 ABOVE

'Ewig Junge Infanterie' ('eternally youthful infantry') – a pipe-smoking grenadier reflects thoughtfully during a lull in fighting, Russia, Summer 1941. In addition to an MG.34, he carries a Pistolet 35(p) or Polish Radom. From a photo-postcard published by Erich Gutjahr, Berlin. LPI archives.



## 82, 83 ABOVE

The sturdy 9mm Pistolet 35(p), or VIS wz.35 'Radom', was very popular in the Wehrmacht. This is an early gun, with a Polish-type slide legend and additional WaA inspectors' marks.

*By courtesy of Ian Hogg.*

## BELGIAN GUNS

Belgium had a centuries-old tradition of gunmaking, concentrated in Liège. By 1940, however, Fabrique Nationale d'Armes de Guerre of Herstal (near Liège) had a mass-production monopoly. FN, once substantially German owned, had enjoyed a particularly chequered history prior to the First World War. Though the factory had returned to indigenous control in 1918, it was immediately sequestered when the Germans invaded Belgium in 1940 and placed under the control of Deutsche Waffen- und Munitionsfabriken AG ('DWM') – with which, irony of ironies, Fabrique Nationale had participated in the pre-1914 Mauser rifle-making

cartel. Operated as 'DWM Werk Lüttich' until recaptured by the Allies in September 1944, the Herstal plant made hundreds of thousands of smallarms for the Wehrmacht.

The Pistolen 626(b) and 641(b) were simple single-action Mle.10/22 blowbacks deriving directly from designs John Browning had perfected early in the twentieth century. Chambering the 7-65mm Auto and 9mm Short cartridges respectively, they offered excellent quality but no great knock-down capability. Production of the 626(b) was initially diverted almost exclusively to the Luftwaffe, which received a little over 100,000 by the end of 1942; deliveries of the 9mm 641(b) to the army, however, had been less than 3,500 in the same period owing to an HWaA decision to make no new 9mm components once Belgian supplies had been exhausted. Total Mle.10/22 production prior to September 1944 amounted to 363,200 guns.

Additional FN-made Mle.10/22 Brownings were retrieved from the Royal Netherlands Army (which designated them

'M1925') and also from Yugoslavia, where 60,000 had been sold in 1923-5. These are practically identical with the guns made in Herstal for the Germans, but have recognizably different markings.

The Pistolet 640(b) was quite different: a powerful 9mm locked-breech recoil-operated Browning, better known as the Mle.35 GP ('Pistolet à Grande Puissance' or 'High Power'). Developed from the US .45 Colt-Browning M1911 in the early 1920s, the GP had been completed by FN technicians after Browning's unexpected death in Liège in December 1925.

The crash of Wall Street in 1929 and subsequent worldwide depression deferred mass-production of the new gun until 1935, when it had been immediately adopted by the Belgian army. Substantial quantities were soon exported to China, Estonia, Finland, France, Lithuania, Peru and Sweden: about 69,000 High Powers were made prior to the German invasion, followed by 319,000 in 1940-4. Apart from guns assembled from Belgian parts, with butts cut to receive shoulder stocks, the Germans concentrated on a stockless

tangent-sight gun; and then, when manufacture proved unnecessarily time-consuming, on a simpler pattern with a fixed back sight. The finish deteriorated visibly in 1943-4, though the material was generally sound.

The GP was at least the equal of the P.08 and P.38; though it lacked the former's accuracy and latter's double-action trigger, it was more durable than the Parabellum and offered a thirteen-round staggered-column magazine instead of the Walther's eight. The first deliveries reached the Wehrmacht in the summer of 1940; 153,464 had been delivered by the end of 1942, exclusively to the army. In later years, however, guns began to reach the Waffen-SS as well.

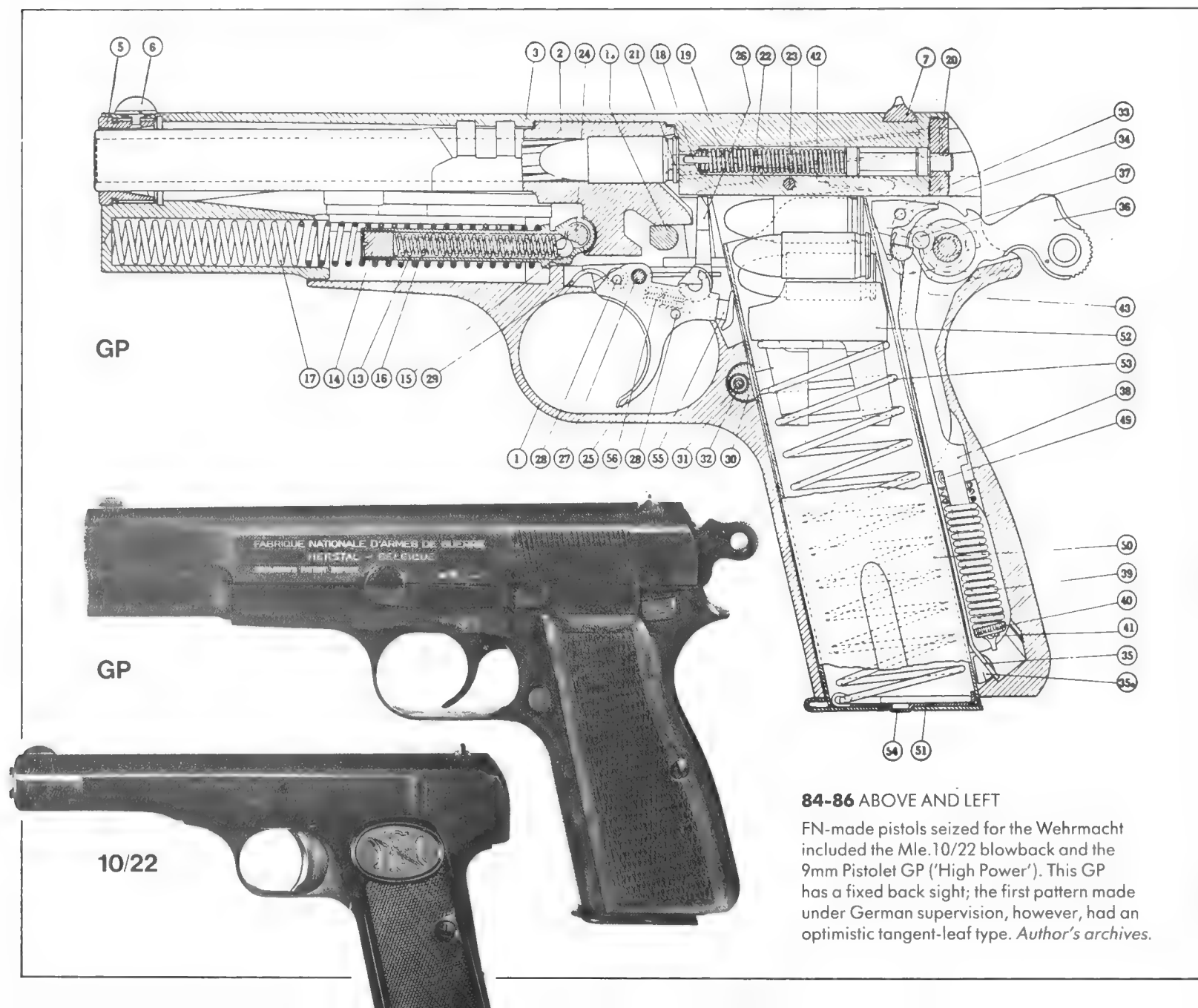
## FRENCH GUNS

France proved another arms-procuring disappointment. The French had been largely revolver-orientated prior to 1918, though there is no evidence that Mle.92 ('Lebel' or 'Modèle d'Ordonnance') were issued to the Wehrmacht. These were simply left with the Vichy forces and police. However, when the Franco-German armistice was agreed on 22 June 1940, cunning partition ensured that the Pyrenean arms-making centres – Hendaye and Bayonne – lay in the German occupation zone.

Manufacture of 7.65mm-calibre seven-shot Unique Mle.16 and nine-shot Mle.17 continued, about 2,000 of the former and 30,000 of the latter being accepted by the Wehrmacht. The first of about 20,000 Unique Kriegsmodelle – a modification of the Mle.17 – then began to leave the Hendaye factory, distinguished by exposed hammers and rounded backstraps. Production continued until the area was recaptured in September 1944.

Pistols were also acquired from Manufacture d'Armes de Bayonne (MAB): about 1,130 6.35mm MAB Mle.A, 2,600 7.65mm MAB Mle.C and possibly 51,160 7.65mm Mle.D were delivered in 1940-4.

Throughout the inter-war period, the French army had experimented with inef-



84-86 ABOVE AND LEFT

FN-made pistols seized for the Wehrmacht included the Mle.10/22 blowback and the 9mm Pistolet GP ('High Power'). This GP has a fixed back sight; the first pattern made under German supervision, however, had an optimistic tangent-leaf type. *Author's archives.*



88

**87, 88 ABOVE**

The French 7.65mm Pistolet Mle.35A, or SACM-Petter, was only seized in tiny quantities: the remainder armed Vichy forces. *Author's archives.*

The Spanish Astra 400, or Mo.1921, was a powerful 9mm blowback characterized by a distinctively tubular slide. *Author's archives.*

87

fectual blowbacks until a locked-breech Colt-Browning clone appeared. Patented in 1934 by Charles Petter, who claimed novelty only in the lockwork, this SACM-promoted pistol rather unexpectedly won the army trials and was adopted as the 'Pistolet Mle.35A'—apparently as an expedient while the government arsenal at Saint-Etienne adapted it for mass-production. However, only about 9,500 Mle.35A pistols had been made prior to the German invasion, numbered from A001A, together with less than 2,000 of the improved Mle.35S. Production of the Mle.35A (or Pistolet 625[f]) recommenced under German supervision in October 1940; work continued until April 1944, but only 23,850 guns were satisfactorily completed.

The Mle.35A was an effectual design, though the safety catch was badly placed (by no means the inhibition to performance some ill-informed writers now claim). Its poorest feature was the comparatively weak and uniquely French 7.65mm Longue cartridge. Had the Mle.35A chambered the 9mm Parabellum, for example, it would have been regarded

among the best of the impressed guns; the action undoubtedly had sufficient inherent strength to handle higher pressures than generated by the 7.65mm Longue.

## HUNGARIAN GUNS

Allied with Germany for much of the Second World War, Hungarian units fought alongside the Wehrmacht on the Eastern Front. A small-but-efficient indigenous smallarms industry based around Budapest made Mannlicher rifles, Solothurn-type machine-guns, Király machine-carbines and blowback adaptations of the pre-1914 locked-breech Frommer pistols. Anxious to use spare production capacity, the Germans soon placed contracts for adaptations of the basic 35M rifle (Gew.98/40, q.v.) and a version of the 37M service pistol with an additional manual safety.

The first contract for 50,000 Pistolen 37(ü), apparently on behalf of the Luftwaffe, was placed in 1941 and completed

in February 1942. An additional order for 60,000 guns followed in 1943, but had only been partially fulfilled when the Germans began to evacuate the Danuvia factory machinery in November 1944. The P.37(ü) was a simple 7.65mm-calibre blowback, acceptably machined from good-quality material but with little else to commend it. The slides of first-contract guns were marked 'Pistole M.37'; second-contract examples displayed 'P.Mod.37'. All bore the letter-code 'jhv'.

## SPANISH GUNS

Spain remained neutral throughout the Second World War, cheerfully supplying weapons to both sides. The Wehrmacht only received guns from Unceta y Cia ('Astra') of Guernica and Bonifacio Echeverria y Cia ('Star') of Eibar. Initially imported through Sudost-Handels-gesellschaft von Ramin of Berlin without HWaA marks, the Astras are uniquely-shaped blowbacks with tubular slides. Purchases of the 6.35mm-calibre Astra

200 amounted to 1,510 (all but ten in January 1943); 85,390 examples of the Astra 300 (7.65mm Auto and 9mm Short) were delivered in 1941-4, together with 6,000 9mm Largo Astra 400 in 1941. The Astra 600/43 was an adaptation of the Astra 400 chambering the Pist.Patr.08. After 10,450 had reached the Germans, a consignment of 28,000 was intercepted by the Allies in September 1944 and returned to Spain, where production ran on into 1945. Ironically, the guns made in 1945 were sold to West Germany in the early 1950s to equip the emerging Bundeswehr!

#### 89 RIGHT

The invasion of Norway and Denmark – Operation 'Weserübung' – contributed paltry quantities of the m/1912 and m/1914 Norwegian Browning. Neither was important in the context of the Wehrmacht's overall pistol requirements. *By courtesy of Masami Tokoi, Düsseldorf.*

#### 90 RIGHT

The Italian Beretta Mo.1934 (9mm Short, pictured here) and Mo.1935 (7.65mm) were popular with German forces stationed in Italy. *Author's archives.*

The Star Modelo B was a powerful recoil-operated Colt-Browning lookalike chambering the standard 9mm Parabellum cartridge, but only 25,000 were acquired in two large consignments: the bulk of the output appears to have been acquired by Britain.

## OTHER GUNS

The invasion of Denmark and Norway provided small numbers of two distinctive pistol designs, the Danish Bergmann-Bayard, m/10-21, and the Norwegian M/1912 and M/1914 Colt-Brownings (Pistolen 657[n]). In addition to 22,211 M/1914 guns made in the Kongsberg arsenal prior to the German invasion of Norway, 7,288 were made in 1941-2 and a final batch of 935 followed in 1945. These are said to have been issued largely to Norwegian Waffen-SS volunteers, but output of Norwegian Colts was not great enough to affect the pistol-procuring programme.

Guns seized from vanquished armies, made in sequestered facilities or purchased abroad were supplemented with Italian Mo.34 (9mm Short) and Mo.35



(7.65mm Auto) Beretta blowbacks – some taken after the collapse of the Italian army in 1943, though about 19,800 additional Mo.34 were made specifically for the Italian socialist army and Italian-based German units in 1944-5.

Webley, Colt and Smith & Wesson revolvers were captured from the Anglo-American forces; US .45 M1911A1 Colt-Browning pistols, taken from the US

Army, were greatly appreciated on account of their prodigious stopping power; and obr.1895g gas-seal Nagant revolvers, plus smaller quantities of obr.1930g Tokarev pistols, were taken in Russia.

One of the biggest problems of such diversity was ammunition supply: by the 1945, there were no fewer than six different semi-official chamberings to add to

**91 LEFT**

The Russian Tokarev pistol, which had been out-of-favour in Russia before being reinstated in 1940, was less common than the Nagant 'gas-seal' revolver. As the Tokarev fired the same ammunition as the 7.63mm Mauser, however, small numbers were often impressed into German service. *Author's archives.*

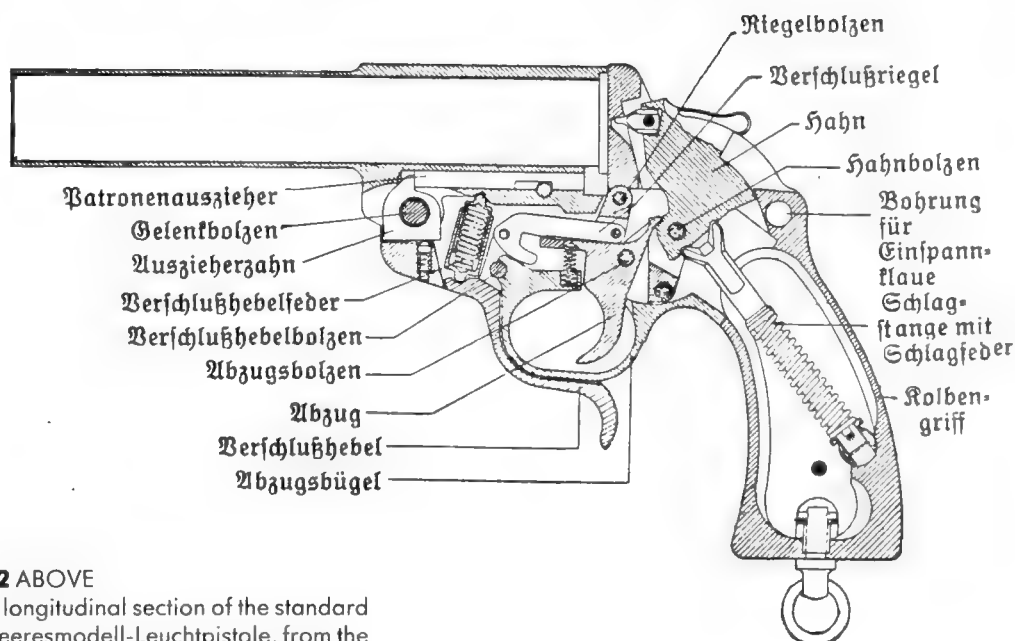
the 9mm Pist.Patr.08 – 6.35mm and 7.65mm Browning; 9mm Browning Short (.38 ACP); 9mm Long; and .45in. By the last desperate weeks of the Second World War, however, many of the non-standard handguns had ceased to be useful – either there was simply no ammunition, or what stocks there were could not be transported satisfactorily.

## Signal pistols

### HEERESMODELLE

The standard army design was the Walther Heeresmodell or Heeres-Leuchtpistole, a vast improvement on preceding designs that showed Fritz Walther's genius for combining several unrelated features in a single component. Patented in August 1930 (DRP 506,011, sought on 22 December 1926), the single-action tipping-barrel breech was locked by an underlever. Adopted by the Reichswehr in 1928, it measured 245mm overall, had a 155mm smoothbore barrel and – with the original steel frame – weighed about 1,275gm. The calibre was '4-bore', nominally 26.65mm but actually nearer 26.9mm.

Between 100,000 and 150,000 of these guns were delivered to the Reichswehr in 1928-34. The rearmament programmes of the mid 1930s then brought a reappraisal from which Walther was asked to lighten

**92 ABOVE**

A longitudinal section of the standard Heeresmodell-Leuchtpistole, from the contemporary service manual.



the signal pistol by substituting a duraluminum frame for steel. No mechanical changes were made, although bakelite grips were substituted for chequered wood and the frames were anodized black instead of being blued. The alloy-pattern signal pistol weighed only a little more than half its predecessor.

In 1938, with rearmament in full swing, the Heeresmodell was simplified in an attempt to accelerate production. Components that had been machined from solid forgings and bar-stock were replaced with stampings: the operating spring, which had once been enclosed in a double cylinder, was simplified; the lanyard ring was retained by rivets instead of bolts; and the extractor became plain-faced. A signal pin was added to indicate when cartridges were chambered.

As the war progressed, so the quality of material declined and the standards of external finish deteriorated. Walther made some pistols with steel barrels and frames in 1943, to conserve the valuable alloy for more important tasks, and a

zinc-frame variant was developed in 1944. Apart from a noticeable increase in weight (to about 1,250gm), the zinc-frame Heeresmodell was identical with the preceding alloy pattern apart from displaying ZINK 4.

Heeresmodelle were originally made exclusively in the Zella-Mehlis Walther factory, where production continued until supplies of alloy were withheld in 1944. Some of the guns made in 1943 embodied steel parts – usually the barrel or frame – but none has yet been reported with a zinc frame. Pre-1940 guns bore commercial marks, but later examples displayed the ‘ac’ code and a two-digit date. Heeresmodelle were also made by Erfurter Maschinenfabrik B. Geipel GmbH, ‘Erma-Werke’ (‘ayf’), where production of alloy-frame guns began late in 1940 and continued until zinc was substituted late in 1944. Berlin-Lübecker Maschinenfabrik (‘duv’) began work in its Lübeck factory late in 1941, the first guns appearing early in 1942. Production ceased at the end of 1944, by which time

#### 93 ABOVE LEFT

Usually claimed to be one of the few known photographs of the standard Heeresmodell signal pistol in a combat, this photograph was a still taken from the officially filmed ‘attack on the Maginot Line’ – taken after the event, once the French defenders had capitulated. *LPI archives.*

#### 94 ABOVE RIGHT

Taken in Russia in the winter of 1941, this photograph shows a Heeresmodell-Leuchtpistole holster being worn by the Unteroffizier in the foreground. *LPI archives.*

virtually all had zinc frames. An automotive battery maker, Motor-Condensator-Kompanie Scholz AG of München (‘dtd’) made zinc-frame guns in 1944-5, but only in minuscule quantities.

### HEERESMODELLE DERIVATIVES

The Gezogene Leuchtpistole, also known as the ‘Leuchtpistole Z’ or ‘Kampfpistole’ arose when experience in Russia showed





that a small hand-held grenade projector could knock out vehicles, tanks and small strongpoints. The Kampfpistole was a specially rifled Heeresmodell, adapted to fire shells; the introductory pamphlet, *Merkblatt für die Erprobung der Leuchtpistole Z, sowie der Sondermunition...* is dated 25 March 1942.

Details of the special projectiles will be found in the relevant appendix. All were fired from die-cast aluminium (more rarely, brass or steel) cartridge cases, and had pre-rifled steel bodies that engaged the rifling cut into the barrels of otherwise standard signal pistols. The grooves were about 7mm wide and 0.125mm


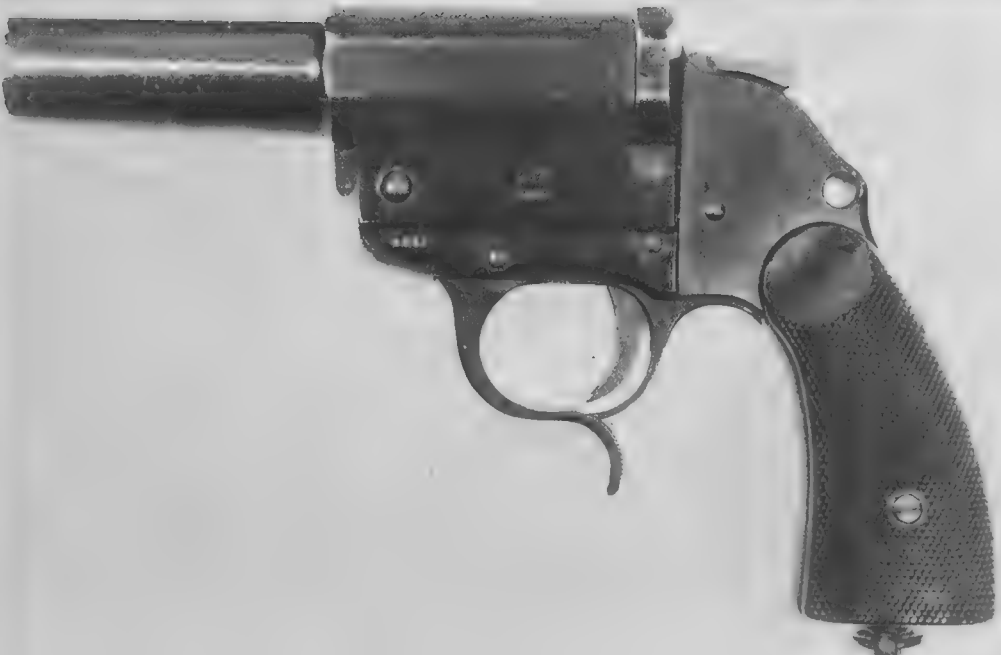
#### 95-97 LEFT

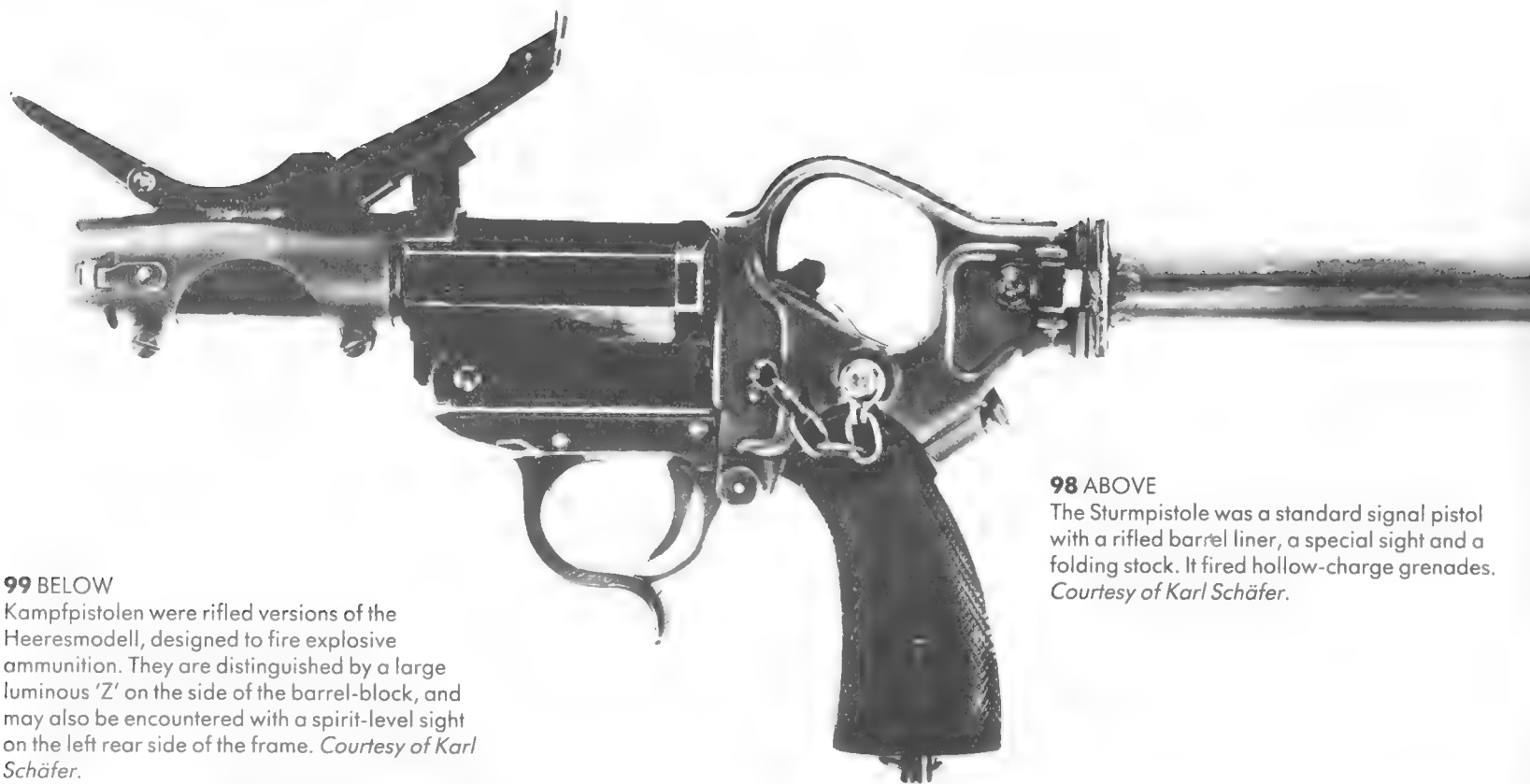
From top to bottom: a standard Walther-made Heeresmodell with a 155mm barrel; an anodized aluminium Heeresmodell with bakelite grips; and an example of the zinc-alloy frame version. Courtesy of Karl Schäfer.

deep, the rifled portion of the barrel measuring 120mm. An elevating quadrant and spirit level were added to the left side of the frame behind the breech and a large luminous 'Z' appeared.

Walther guns ('ac') exhibited a glossy brownish black finish and were all made as Leuchtpistolen Z. Some matt-black Erma guns ('ayf') were converted from standard flare pistols.

The Sturmpistole was a 1943-vintage Heeresmodell conversion with a rifled barrel liner, reducing the bore diameter to about 22mm. A sleeve carrying a special sight was then clamped to the barrel and a folding shoulder stock was attached to the frame. The ammunition issued with the Sturmpistole could not be interchanged with standard flare-pistol or the Leuchtpistole Z patterns.

The muzzle-loaded 'Panzer-Wurfkörper 42 für Leuchtpistole' was a hollow-charge bomb relying on the Munroe Effect to destroy Russian T-34 or KV-1 tanks; 10cm of armour plate could be penetrated at close range. The Sturmpistole could also fire a breech-loaded high-explosive shell, but this had an unreliable combustion fuze with a mere one-second delay and was universally mistrusted. Its packaging was always marked ACHTUNG! NUR AUS PANZERN ODER GLEICHVERTIGER DECKUNG VERFEUERN! — 'Danger! Only fire from tanks or similar cover!'.  





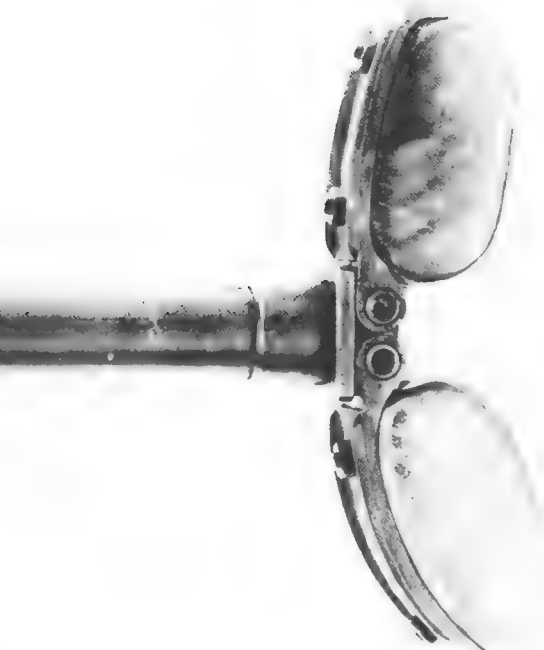
**98 ABOVE**

The Sturmpistole was a standard signal pistol with a rifled barrel liner, a special sight and a folding stock. It fired hollow-charge grenades. *Courtesy of Karl Schäfer.*

**99 BELOW**

Kampfpistolen were rifled versions of the Heeresmodell, designed to fire explosive ammunition. They are distinguished by a large luminous 'Z' on the side of the barrel-block, and may also be encountered with a spirit-level sight on the left rear side of the frame. *Courtesy of Karl Schäfer.*



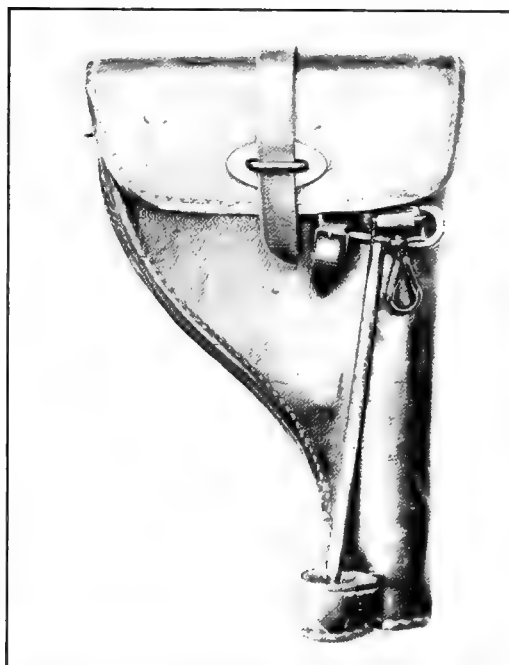


Sturmpistolen bore no special marks and measured about 345mm overall with the stock folded (550mm extended), had 135mm smoothbore barrels with a rifled liner, and weighed about 3kg. They were heartily disliked for their violent recoil.

## LATER ARMY DESIGNS

The standard Walther-type Heeresmodell was complicated, expensive to make, and comparatively difficult to maintain under severe service conditions. In the early 1940s, the HWaA began a search for a simpler design. The result was the Leuchtpistole 42 ('LP.42'), which appears to have been based on a pre-war Moritz & Gerstenberger EM-GE design. The LP.42 had a single tipping barrel, locked by a crossbolt through the frame above and behind the trigger. Pressing this through to the left released the barrel after the hammer had been retracted. There was no safety catch.

The LP.42 was made largely from substantial, but very crude, pressings and had poorly ribbed bakelite grips. It measured 220mm overall, had a barrel of 155mm and weighed about 1,125gm. Two contractors have been identified: HASAG—Hugo Schneider AG, Abteilung Lampenfabrik, Leipzig ('wa') and C. & W. Meinel-Scholer of Klingenthal in Sachsen ('euh'). The Meinel-Scholer guns are particularly poorly made, which suggests 1944-5 as the likeliest date of manufacture. A rifled version was also made.

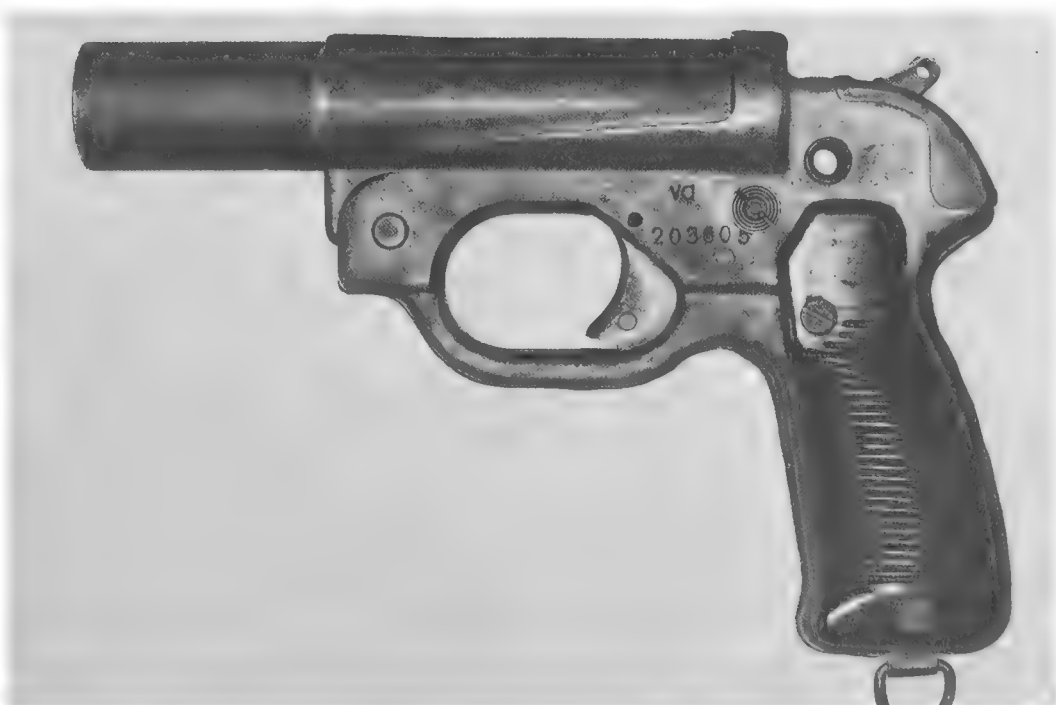


### 100 LEFT

This holster, which accepts either the Heeresmodell or LP42, is made of compressed paper and dates from 1944-5. *Courtesy of Karl Schäfer.*

### 101 BELOW

Made largely of heavy-duty stampings, the LP42 was a simplified replacement for the Heeresmodell. This is a Schneider-made example (note the code 'wa' above the serial number). A rifled Kampfpistole 42 (LP42Z) was also made in small numbers. *Courtesy of Karl Schäfer.*

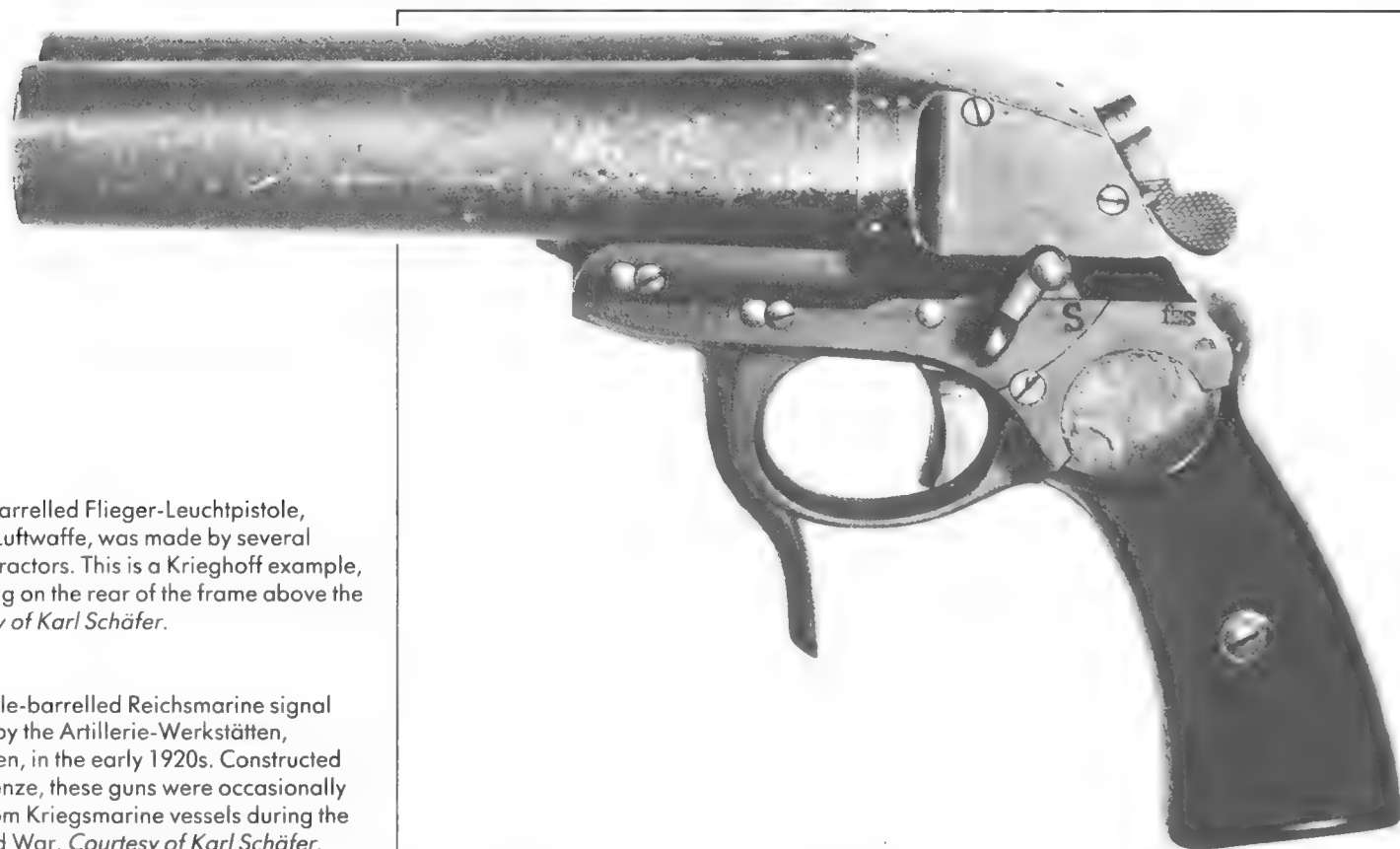


## LUFTWAFFE PISTOLS

Excepting isolated use of the Walther Heeresmodell, it seems that small quantities of the 'Lauflose Fliegerpistole System Eisfeld', made by J.G. Anschütz of Zella-Mehlis ('JGA'), satisfied the pre-1935 air force and paramilitary sports-flying agencies. The Eisfeld pistol was distinguished by its apparent lack of a barrel; instead, it had an 11mm-calibre laterally-hinged breech unit into which the stem of a fixed flare could be placed once the sidelatch had unlocked the breech. The breech unit

was then closed, locked, and a pull on the double-action trigger ignited the charge.

Eisfeld pistols were about 145mm long, weighed a mere 600gm and could not accept standard 'Kaliber 4' signal cartridges. The special flares apparently included single-star patterns (145mm long, 200gm, duration 7 seconds) in red, yellow, green and white; double stars in the same colours; a white parachute flare (360mm, 350gm, 70 seconds); an observation cartridge intended as a wind indicator (285mm, 350gm 1-2 minutes); and an obscuration cartridge (170mm, 365gm) which emitted a cloud of grey-white smoke. As the Eisfeld system was not particularly effectual, the Luftwaffe



**102 RIGHT**

The double-barrelled Flieger-Leuchtpistole, issued to the Luftwaffe, was made by several differing contractors. This is a Krieghoff example, 'fzs' appearing on the rear of the frame above the grip. *Courtesy of Karl Schäfer.*

**103 BELOW**

This is a double-barrelled Reichsmarine signal pistol, made by the Artillerie-Werkstätten, Wilhelmshaven, in the early 1920s. Constructed largely of bronze, these guns were occasionally recovered from Kriegsmarine vessels during the Second World War. *Courtesy of Karl Schäfer.*







adopted the Modell L. Even more complicated than the navy's Walther SLD, which it superficially resembled, the Modell L weighed less than a kilogram and was singularly unpleasant to fire. It is sometimes mistakenly identified as a Walther, but was designed on behalf of the Oberkommando der Luftwaffe by amalgamating the basic features of the best contemporary designs. The barrels of the Modell L or Fliegerleuchtpistole ('FL') tipped downward after a finger-lever resting against the front of the trigger guard had been pushed forward. A radial lever-type selector on the breech behind two cocking indicators could fire either of or both the barrels. A safety lever on the left side of the frame could be rotated forward to expose 'S' (Sicher, 'safe') or back to expose 'F' (Feuer, 'fire').

The aluminium frames of the original guns were anodized black or dark grey. Most of the screws were nickelled; the finger lever, the trigger and the firing mechanism were usually steel; and the selector and the safety catch generally proved to be brass (early guns) or light alloy (later examples). The grips, originally chequered walnut, were bakelite on later guns. Overall length of the 165mm-barrel Modell L varied between 275 and 280mm. Weight was 1,210-1,275gm.

They were made by four principal contractors: Emil Eckholdt of Suhl (ECKO in an oval, later 'ojr'); Heinrich Krieghoff of Suhl (an encircled HK monogram, 'fzs'); Gustav Bittner of Weipert ('GBW' on a triangle, 'gpt'); and August Menz of Suhl (an entwined 'AM' monogram). Most surviving guns will also be encountered with the Luftwaffe contract (?) number 'FL.24483' – later 'LN.24483' – on the left side of the frame above the finger-lever. Menz ceased work prior to the Second World War, while Eckholdt made the 105mm-barrelled 'Hahnlos Doppelläufige Leuchtpistole' for commercial sale.

#### 104, 105 ABOVE AND BELOW

The double-barrelled Walther SLD was issued to the Kriegsmarine to replace the obsolescent AWW pattern (see 103). Originally made of stainless steel with wood grips and fore-end, though later with an alloy frame, the SLD is regarded as among the best of all signal pistols. These are 1941-vintage Walther and 1944-vintage 'eeu' examples. *Courtesy of Karl Schäfer.*



## KRIEGSMARINE DESIGNS

During the Reichsmarine period (1921-35), the navy, very short of signal pistols, had simply copied the standard pre-1918 pattern. Made in the naval workshops in Wilhelmshaven, largely of bronze (with some steel parts), the tipping-barrel block was locked by a catch on top of the breech. Opening the barrel-block cocked the internal strikers, but the safety lever on the left side of the frame – immediately behind the trigger – had to be rotated to expose the word 'FEUER' before firing. The post-1921 guns could be distinguished from their Kaiserliche Marine predecessors by the substitution of a large chequered breech catch for the small ribbed original, and by red or red-brown bakelite grips. The double-barrel type measured 215mm overall, had 113mm barrels and weighed about 1,225gm.

Walther's Doppelläufige Signal- und Leuchtpistole ('SLD'), intended to replace the previous navy guns, was among the first signal pistols to be made of corrosion-resisting stainless steel. Designed in 1935 and adopted by the Kriegsmarine a

year later, it was hailed as a technical masterpiece mating a similar dropping-barrel action to its predecessor with an enclosed double-action trigger mechanism adapted from the Polzei-Pistole. The interlocking parts were self-retaining and a radial safety lever appeared on the left rear of the frame, where it could be thumbed down to expose 'SICHER' ('safe') or horizontally to display 'FEUER' ('fire').

The breech was latched by an under-lever beneath the trigger guard, and a lever-type selector on top of the breech fired either barrel – or both together if placed centrally.

The SLD had a distinctive short wooden fore-end beneath the barrels. The earliest guns bore Walther's banner mark and the date on the left side of the breech below the barrel-block, together with the serial number; post-1940 guns were simply marked '1940 ac 1833'. Production of the stainless-steel SLD ceased at the end of 1943, after nearly 4,000 had been made. An aluminium-alloy frame version was then made by a local trade association — Lieferungsgemeinschaft westthüringisches Werkzeug- und Metallwarenfabriken eGmbH of Schmalkalden ('eeu') – until the end of the war. Despite black-anodized finish and light weight, it

was virtually identical with the standard gun.

A wartime simplification of the basic SLD design, generally credited to Walther on somewhat doubtful authority, was developed in 1944. It never reached production status.

The Einzelläufige Signal- und Leuchtpistole ('SL' or 'SLE') was simple a single-barrelled SLD lacking the selector. Production began in the mid-1930s and continued until about 3,100 had been delivered by the end of 1944. The first guns bore the Walther name and banner trademark on the left side of the frame below the barrel-block, but the 'ac' code was substituted in the autumn of 1940. A black-anodized aluminium-alloy frame variant appeared c.1942-3, reducing the weight from 1,785gm to 1,105gm; most frames display 'eeu' instead of 'ac'.

### 106 BELOW

The SL was a single-barrel version of the SLD. This particular gun is a Walther-made stainless steel example, dating from 1943, but a few alloy-frame guns were made by 'eeu' in 1942-3. *Courtesy of Karl Schäfer.*



# FOUR

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## SUBMACHINE-GUNS

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The light automatics of the Third Reich, German-made or captured, from the Bergmann MP.18,1 to the MP.3008.



# Submachine-guns

The Germans issued small numbers of the world's first true submachine-gun<sup>1</sup>, the Bergmann 'Muskete' or MP.18.I, in 1918. Developed by Hugo Schmeisser a year previously, the light automatic weapon was intended for raiding parties and 'Stormtroops' (Sturmtruppen). Standard infantry rifles were too clumsy in this role, even the lightest of the standard light machine-guns was too heavy, and the long-barrelled Parabellum pistol – the LP.08 – was semi-automatic only.

The MP.18.I, however, presents something of an enigma – not only owing to its rather odd nomenclature, but also on account of its questionable official status. The first patent protecting its action (DRP 319,035) was granted to Theodor Bergmann of Gaggenau, Baden, on 30 December 1917; an additional patent to allow the mainspring to double as the action-locking catch spring, DRP 334,450, followed on 26 April 1918. In April 1918, too, the first manual was published. However, *Leitfaden für die Maschinenpistole*

1 The Italian Villar Perosa, sometimes claimed to have been the first true submachine-gun, was actually a diminutive machine-gun

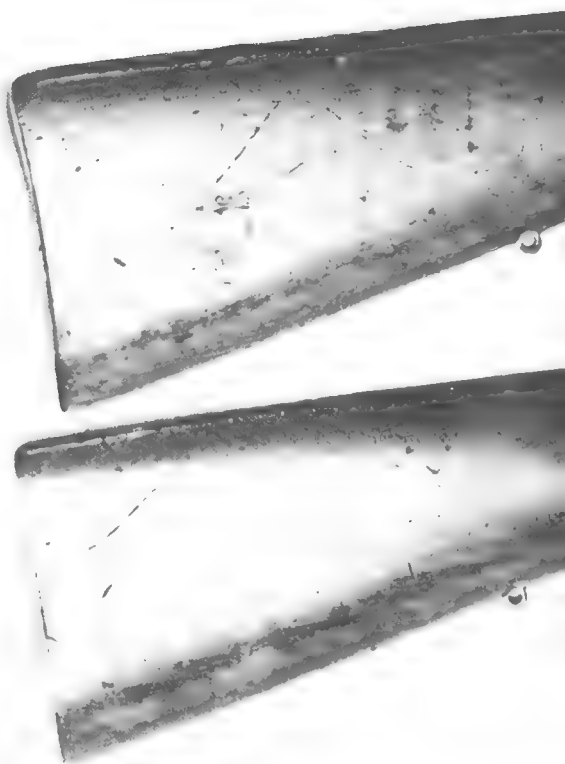
18,I (M.P. 18,I.) holds no clues to the odd suffix; additionally, the omission of a Druck-Vorschrift identifier may indicate that the gun was never adopted officially. It has been very plausibly suggested by Joachim Görtz, in “Wieso Maschinenpistole ‘18,I?’” (*Deutsches Waffen-Journal*, December 1983) that the ‘18,I’ suffix actually refers to the relevant portion of the military budget – Chapter 37, Title 18 of Artillerie- und Waffenwesen – and, consequently, is linked to the year of its first military trials by nothing other than coincidence.

Claims that more than 50,000 guns were 'in service' by the end of the First World War are inflated. However, as gun 17677 bears pre-1918 army inspectors' marks, production was substantial.

The MP.18.I – whatever its genesis – was a simple but sturdy blowback firing 9mm pistol cartridges automatically at about 450 per minute. Measuring 815mm overall, with a 200mm barrel and an unladen weight of 4.18kg, it had a distinctive ventilated barrel jacket and a wood half-stock with a grasping groove in the fore-

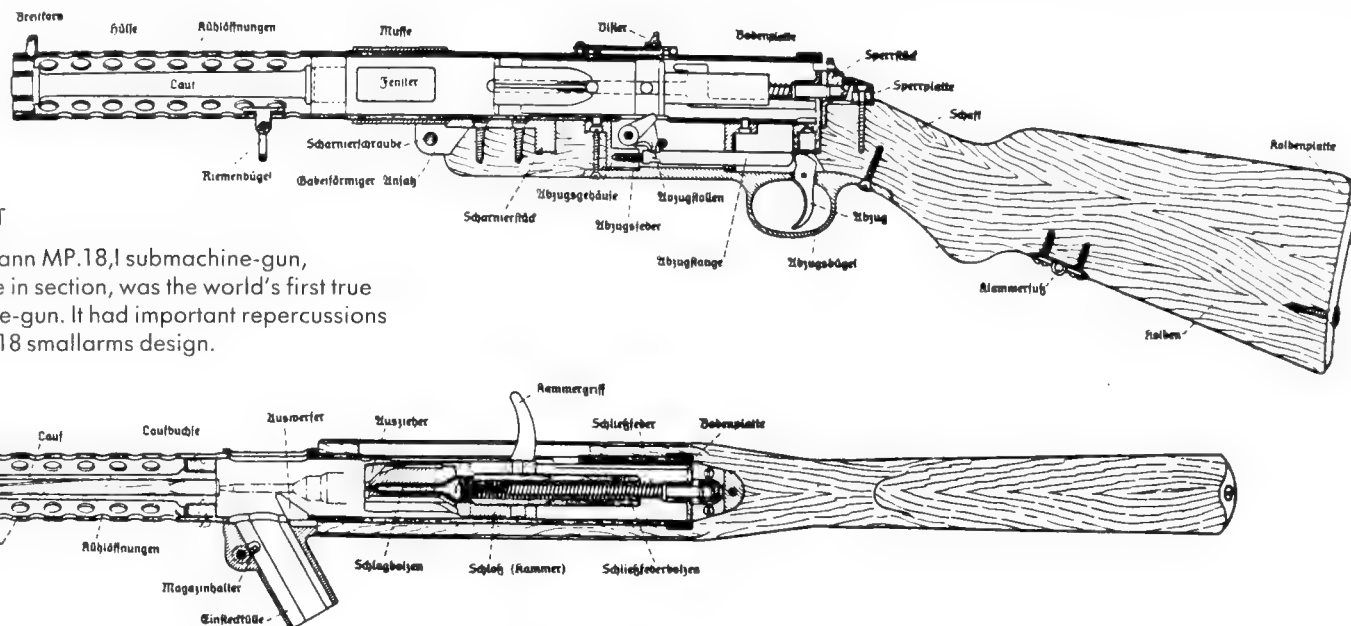
This Bergmann MP.18.1, dating from 1918, was modified during the Reichswehrzeit to accept a conventional straight box magazine. Conversions may be distinguished from the MP.28 (q.v.) by the absence of a selector in the right side of the stock above the trigger. *By courtesy of The Pattern Room, Enfield Lock.*

107 BELOW RIGHT



## 108 RIGHT

The Bergmann MP.18, a submachine-gun, shown here in section, was the world's first true submachine-gun. It had important repercussions on post-1918 smallarms design.



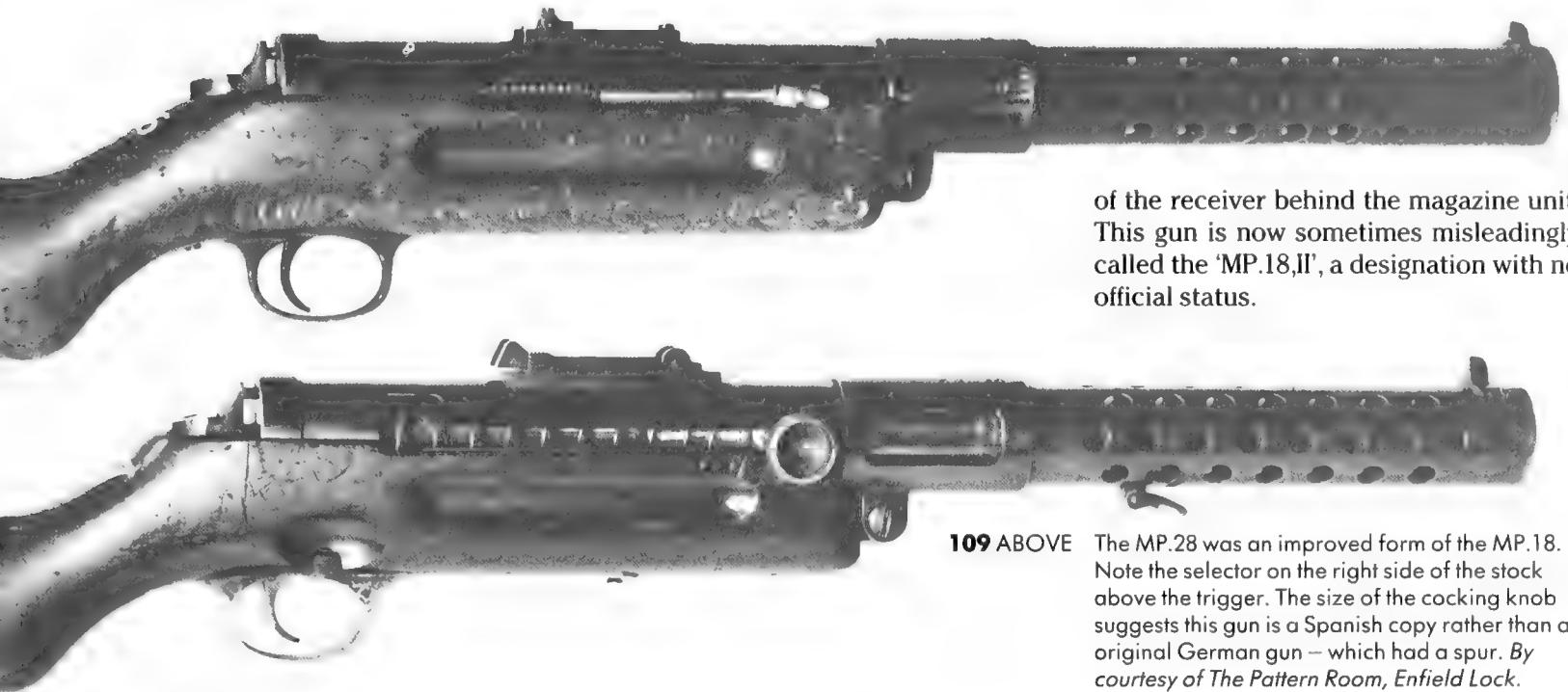


end. The most obvious feature, however, was the diagonally-projecting feedway for the standard Trommelmagazin 08. This was presumably an expedient: the TM.08 had a comparatively large magazine capacity – 32 rounds when fully laden – but it was heavy, clumsy and less reliable

than a more simple box pattern. The MP.18,I/TM.08 combination, therefore, was far from ideal.

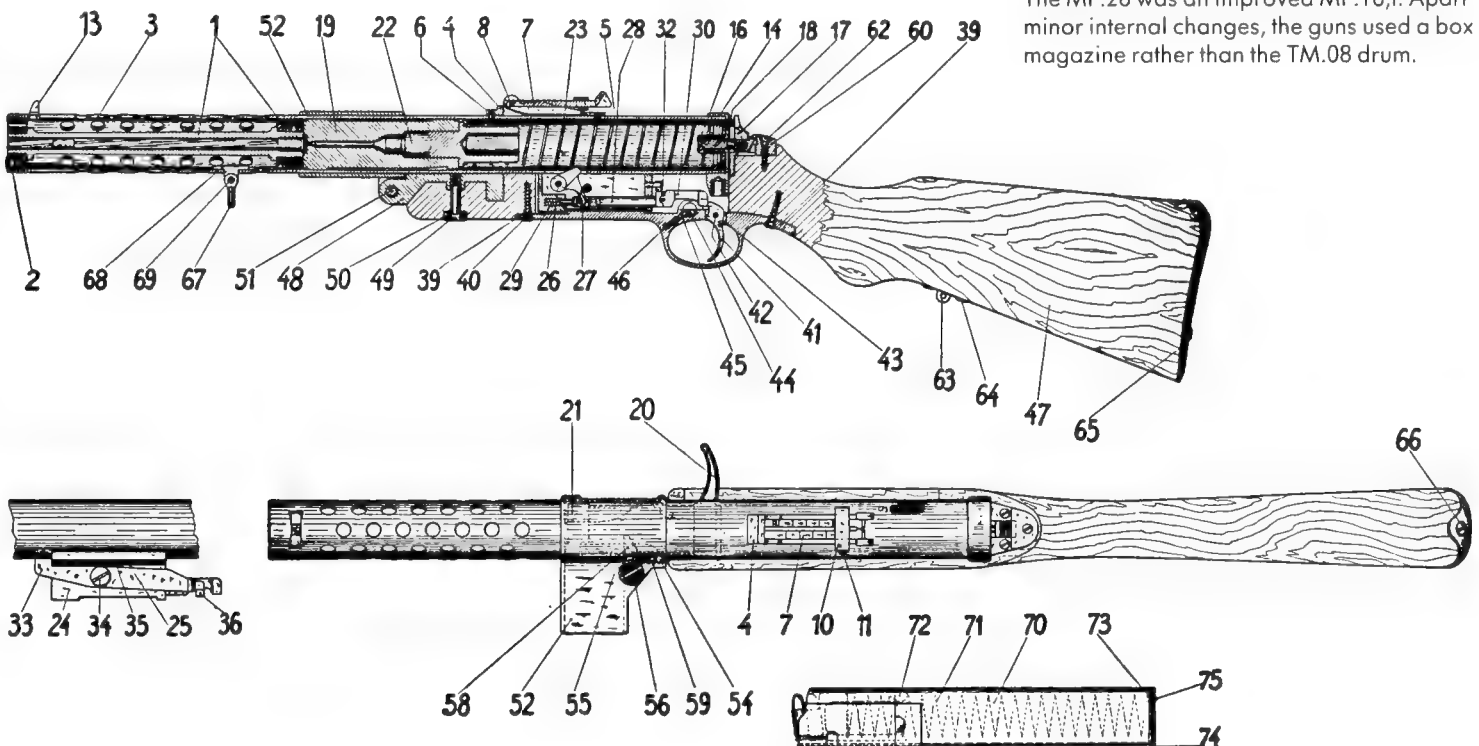
At the end of the First World War, the Allies confiscated many surviving Bergmanns. However, though some were apparently destroyed under Inter-Allied

Military Control Commission supervision in 1920, others remained in police hands. These were subsequently converted for a conventional box magazine by replacing the feedway block and removing part of the wooden fore-end. A bolt-blocking safety catch was added to the front left side



of the receiver behind the magazine unit. This gun is now sometimes misleadingly called the 'MP.18,II', a designation with no official status.

**109 ABOVE** The MP.28 was an improved form of the MP.18. Note the selector on the right side of the stock above the trigger. The size of the cocking knob suggests this gun is a Spanish copy rather than an original German gun – which had a spur. By courtesy of The Pattern Room, Enfield Lock.



**110 BELOW** The MP.28 was an improved MP.18,I. Apart from minor internal changes, the guns used a box magazine rather than the TM.08 drum.

## LATER BERGMANN'S

Original guns began to wear out by the late 1920s and so a modified gun was produced by C.G. Haenel Waffen- und Fahrradfabrik of Suhl and licensed to SA Belge Anciens Établissements Pieper of Herstal-lès-Liège in Belgium. Pieper exported them to China, Bolivia, Japan and elsewhere in 1928-35 without Allied interference. The MP.28 was adopted by Portugal, as the Mo.929, and in Belgium as the Mi.Mle.34. It measured about 812mm overall, had a 200mm barrel and weighed 4kg unladen. It featured a lateral selector button above the trigger, which allowed semi- or fully-automatic fire (marked 'E' and 'D' respectively), and a new mainspring. The MP.28 also had an optimistic tangent-leaf back sight graduated from 100 to 1,000 metres. Its only safety feature was provided by turning the retracted cocking handle up into a separate recess above the cocking-handle slot.

## SOLOTHURN BLOWBACKS

Once Hitler had gained power and the drive towards clandestine rearmament intensified, it became clear that the MP.28 was not particularly effectual. The S1-100 or Solothurn submachine-gun, allegedly developed by Rheinmetall's Louis Stange, refined the basic Bergmann system by placing the mainspring in the butt, where the bolt acted on it through an intermediary rod. This softened the action and reduced the cyclic rate by about 25 per cent compared with the original MP.18 series.

Even in the earliest guns, a sliding lever-type fire selector was inlet in the left side of the fore-end, and the receiver-top was machined from a solid block rather than simply tubular. This allowed the top cover, hinged immediately behind the magazine feedway block, to swing upward to give access to the action. Standard guns were about 775mm long, with

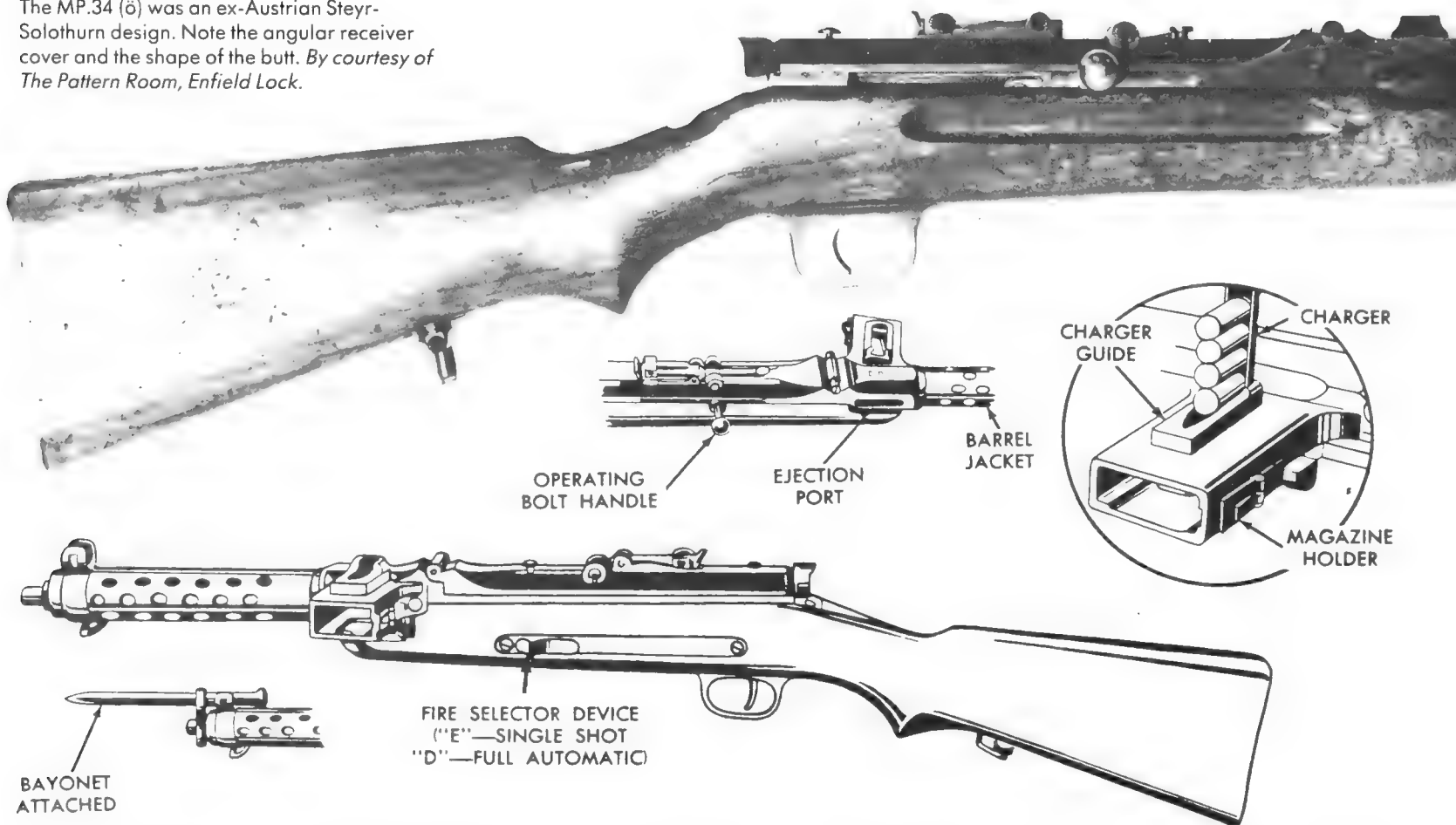
barrels measuring about 200mm, and weighed 4kg unladen. The loaded 32-round magazine added an additional 1.1kg. Cyclic rate was about 550-600rpm.

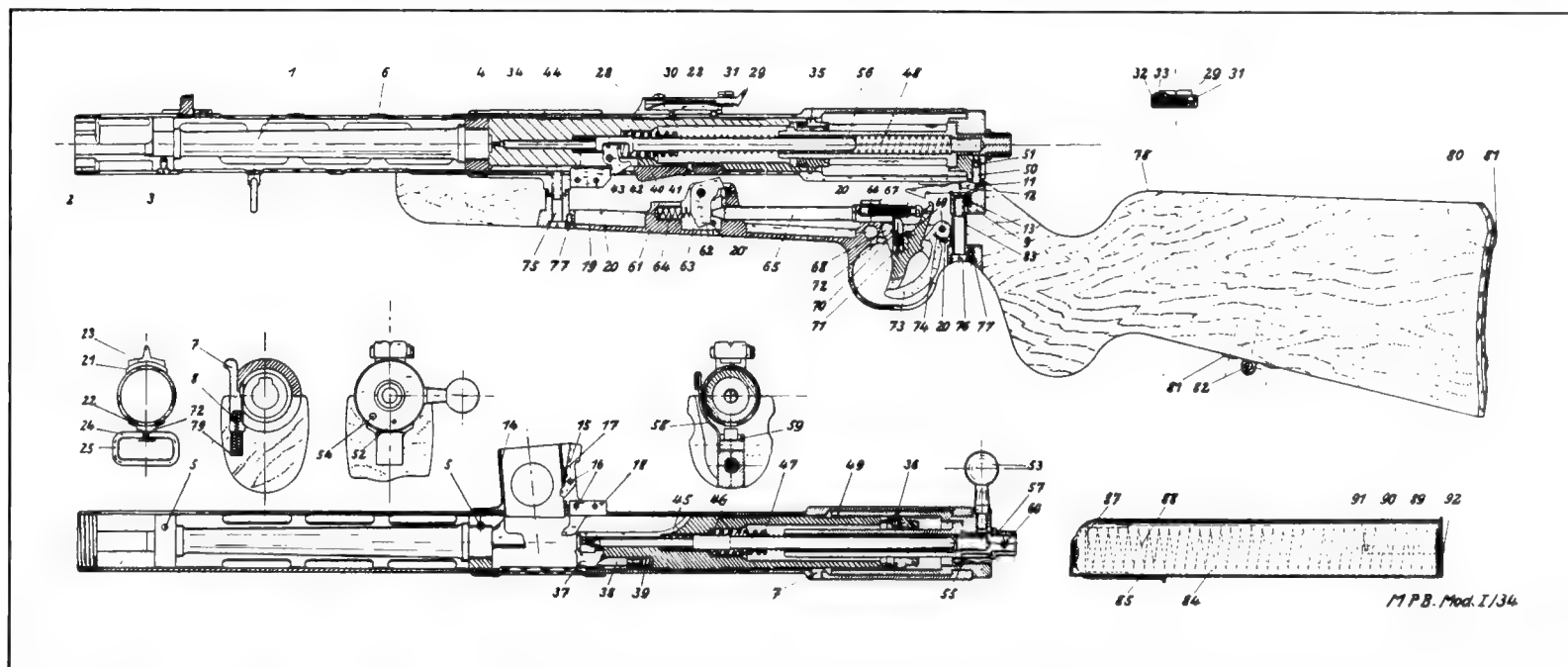
A series of similar guns was made by Waffenfabrik Solothurn AG, a Swiss-based metalworking company created by Rheinmetall in April 1929 with the co-operation of Steyr. Here, weapons were developed away from the prying eyes of the Allies. The basic S1-100 submachine-gun was made in a number of differing guises, with barrels of varying length, bayonet lugs, and even a special light tripod mount. Small deliveries went to countries as disparate as Bolivia and Japan, in calibres ranging from 7.63mm Mauser to 9mm Steyr.

The Austrian police were was sufficiently impressed to adopt a variant of the S1-100 as the 9mm Maschinenpistole M30, and the army then took a modified M34 variant; made under licence in the Steyr-Daimler-Puch factory, these chambered the 9mm Mauser 'Export' cartridge (army guns) or 9mm Steyr (police guns);

### 111, 112 BELOW RIGHT

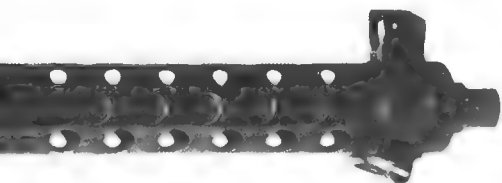
The MP.34 (ö) was an ex-Austrian Steyr-Solothurn design. Note the angular receiver cover and the shape of the butt. By courtesy of The Pattern Room, Enfield Lock.





### 113 ABOVE

Drawings of the short-barrelled 'M.P.B. Mod. I/34', a later Bergmann design employing a non-reciprocating cocking bolt. Note, however, its complexity compared with the earlier MP.28.



the standard M95 knife bayonet would slip over the exposed muzzle and latch on a lug on the right side of the perforated barrel jacket. The most obvious distinguishing feature was the butt which, in the police M30, had an odd concave comb. The M34 had a conventional butt with a distinctively Austrian pointed pistol grip. Tangent-leaf back sights on the receiver cover were graduated from 50 to 500 metres.

An interesting feature rarely found on guns in this class was the charger guide milled into the top surface of the magazine feedway. The magazine could be inserted vertically underneath this to facilitate reloading, then removed and inserted horizontally to permit firing to begin.

The beautifully-made MP M34 measured 810mm overall, with an 205mm barrel, and weighed about 4kg unladen; the loaded 32-round magazine added

about 600gm to the basic laden weight. Cyclic rate was about 400-450rpm. Steyr-made guns were sold to Portugal, where they served as the 7.65mm PM Mo.937 and 9mm PM Mo.942; others went to Spain, where they served in the Civil War, or to South America.

After the Anschluss, when the remnants of the Austrian army was assimilated in the Wehrmacht and suitably re-equipped, surviving MP34 were re-issued to the Luftwaffe as Maschinenpistole 34(ö). The relevant manual, L.Dv 258, is dated 30 October 1939. Other guns were issued to the German police forces under the designation 'MP.34'; most of these chambered the 9mm Steyr cartridge, and would thus have been taken from the Austrian police. Some were converted for the Pist.Patr.08 in the early 1940s. The Austrian guns were much liked, being reliable and superbly made.

Austrian-type MP.34 (ö) bear the normal commercial Steyr marks. However, production of modified 9mm Parabellum guns continued under HWaA supervision. These lacked the original bayonet lug and bore the coded maker's mark '660'. Production appears to have stopped in 1940, when the Steyr factory was ordered to tool for the standard MP.40 (q.v.).

### EARLY MASCHINENKARABINER

Experiments were undertaken in the mid 1930s with greatly enlarged Bergmann-

type guns, inspired by Hugo Schmeisser and made by Haenel, but these were too much gun for too little power and were soon abandoned. The MK.36/III 'System Schmeisser' – which had a Vollmer-type telescoping mainspring – was a simple blowback chambering the 9mm Pist.Patr.08, but measured 1,130mm overall, had a 502mm barrel and weighed 4.77kg without its magazine; it even shared the noscap and bayonet-bar of the Kar.98k. Cyclic rate is estimated to have been about 500rpm. Its detachable 20- or 32-round magazine protruded centrally beneath the action but, though unusually comfortable to fire, the MK.36 was much too unwieldy. Had it fired an intermediate cartridge, the first examples of which were then being tested experimentally in the Vollmer A.35, the MK.36 might have been a great success. Instead, it was rapidly consigned to the scrapheap of failure.

### BERGMANN BOLT-COCKERS

Bergmann & Müller developed several submachine-guns in Denmark in the early 1930s, where the 'Model 1932' (the application for a German patent being dated 6 July 1932) was manufactured by Schulz & Larsen Gevaerfabrik of Otterup. This gun had an unusually long barrel with the tangent-leaf back sight immediately above the magazine aperture, and a separate non-reciprocating bolt-type cock-



**114** Appreciably more complex than the army designs, the Bergmann MP.35 was issued to the police and – particularly – the Waffen-SS, on whose behalf the wartime production contract had been placed. *By courtesy of The Pattern Room, Enfield Lock.*

# 115 BELOW RIGHT

The MP.E, designed by Vollmer and made by Erma of Erfurt, was popular with the police. The vertical fore-grip is most distinctive. *LPI archives.*



ing handle appeared on the right rear side of the action. A bolt-locking catch lay on the left side of the receiver. Fitted with sling swivels, and with a lug for the standard Danish service bayonet attached to the right side of the perforated barrel jacket, the Schulz & Larsen/Bergmann guns were offered for export in several differing chamberings from 7.63mm Mauser to .45 ACP.

Once the influence of the Treaty of Versailles had waned appreciably in the mid 1930s, work reverted Germany where Theodor Emil Bergmann and Dietrich Stahl had formed 'Theodor Bergmann & Co. GmbH' in Berlin. The company did not have its own gunmaking facilities and work was initially subcontracted to Carl Walther Waffenfabrik of Zella-Mehlis.

Two versions of the MG.34 Bgm. have been identified, one with a long 1932-type barrel and the other with a short barrel enclosing the compensator. Chamberings available included 9mm Parabellum and 9mm Bergmann-Bayard. The short gun was 840mm overall, with a barrel measuring 200mm, and weighed about 4.1kg; its cyclic rate, about 700rpm, was appreciably higher than most other German submachine-guns. The back sight was normally encountered on the receiver

above the fore-end grasping groove, rather than on the magazine feedway block. A bolt-locking catch was to be found on the left side of the receiver behind the back sight. The barrel jacket was usually longitudinally slotted, and a most distinctive automatic safety blade projected into the trigger guard immediately behind the trigger lever. When the latter was pressed, the safety was automatically pushed backwards and disengaged. Unlike the earlier MP.18 or MP.28, the MP.34 Bgm. feeds from the right rather than the left. This means, rather oddly, that cases are ejected across the body of the firer. Only about 2,000 guns were made in 1934-6; some went to Bolivia, but the majority was purchased by the German police.

The MP.35 Bgm. was a minor modification of its predecessors, originally made by Walther prior to 1939 for the police service and limited exports to Ethiopia, Sweden, Denmark and Spain. In 1940, the SS apparently approached Stahl – then the sole proprietor of 'Theodor Bergmann KG' – hoping to acquire MP.35 Bgm. submachine-guns. The army had been given priority on the MP.38, greatly restricting supplies for the Waffen-SS. Work recommenced towards the end of 1940, though

production was switched from Walther (where facilities were occupied with the P.38) to an SS appointee, Junker & Ruh of Karlsruhe.

The mainspring and the bolt of the MP.35 differed from those of the MP.34 Bgm., though the changes were undetectable externally. Production continued well into the Second World War, guns being encountered with laminated fir or beech stocks, no bolt-blocking safety, simplified machining, and the maker's code 'ajf' rather than the standard 'JRK' commercial monogram. The Bergmanns were apparently well liked, being sturdy and generally reliable, but were prone to breakages in the cocking mechanism or across the pistol-grip. Total production is estimated at about 5,000 by Walther and 40,000 by Junker & Ruh.

## VOLLMER DESIGNS

The submachine-guns designed by Heinrich Vollmer were generally made after the mid 1930s by ERMA – Erfurter Maschinenfabrik B. Geipel GmbH of Erfurt, Thüringen. Development began in the late 1920s and, by 1932, small-scale



production was being undertaken in Switzerland or possibly even France. Though these early guns were simple blowbacks, they often featured telescoping monopods in the front pistol grip (beneath and immediately behind the magazine feed-way). However, these were speedily eliminated.

The standard Vollmer design was known as the Maschinenpistole Erma or M.P.E; popular with the police and paramilitary, though only taken into army ser-



vice when other weapons ran short, it was also exported to Spain during the

#### 116 RIGHT

'Offiziere in Kampf' ('fighting officers') – 'In spite of his painful wound, this young infantry officer doggedly orders his grenadiers to attack...' Apparently taken in Poland in 1940, this photo-postcard was published by Erich Gutjahr, Berlin, to attract youngsters into the army. It is of interest principally for the pouch for three MP.38 magazines visible on the officer's belt, in front of the holster for his P.08. *LPI archives.*

Civil War of 1936-9. Small quantities were sold to the French army and police, though withdrawn – from the army at least – when sufficient examples of the MAS 38 became available.

The M.P.E was a simple blowback, cocked by a reciprocating handle on the right side of the receiver. It measured 892mm overall, with a 250mm barrel, and weighed about 4.15kg without its magazine; cyclic rate was about 500rpm. A radial lever-type fire selector lay in the cut-out in the right side of the stock above the trigger, being marked 'E' and 'D' for *Einzelfeuer* and *Dauerfeuer* (semi- and fully-automatic operation respectively). The gun fed from the left, had a slotted barrel jacket, and featured a most distinctive auxiliary pistol grip pinned and glued to the fore-end.<sup>2</sup>

Early M.P.E often had tangent-leaf sights graduated from 50 or 100m to 1,000m, but later ones – especially those used in German service – had a simpler standing block for 100m with a small auxiliary pivoting 200m leaf. The M.P.E was one of the first efforts to simplify production in the



submachine-gun class, representing an intermediate stage between guns based on the MP.18 and the later MP.38.

2. Some examples of the M.P.E have conventional fore-ends with a grasping groove.

### MP.38 AND MP.40

These guns, generically but wrongly known as 'Schmeissers', were designed

largely by Heinrich Vollmer and Erma-Werke, whose patented telescoping mainspring they incorporate. Developed for the paratroops and armoured-vehicle crews, the *Maschinenpistole 38* (MP.38) was expressly intended for simple mass-production. Its telescoping mainspring assembly was adapted from the Vollmer-designed M.P.E; the receiver and magazine housing were formed from two large pressings; the durable grip units were made from resin-impregnated paper

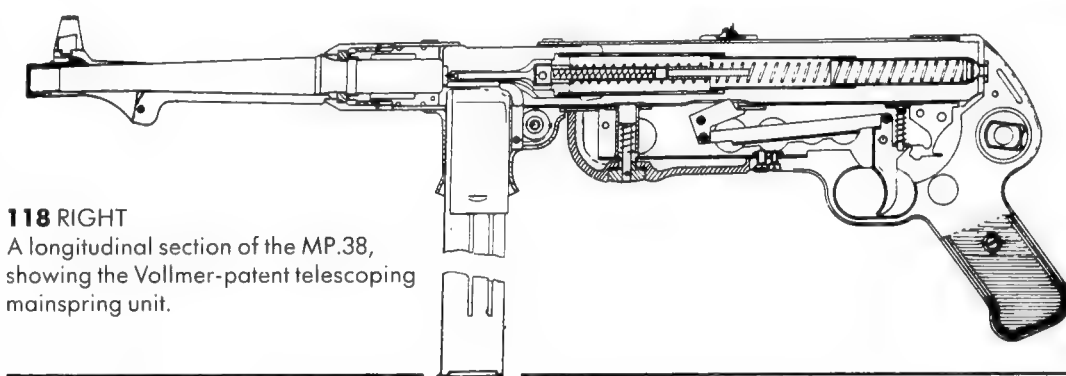
fibres; the barrel jacket was omitted; and a folding metal stock replaced cumbersome wood patterns. The cocking handle was moved to the left of the receiver, permitting the firer to cock the gun without moving his right hand from the grip/trigger unit.

The perfected submachine-gun measured 835mm overall with the stock extended, or merely 630mm when folded; the barrel was 250mm long, rifled with six clockwise-twisting grooves. The first guns weighed 4.1kg, plus 665gm for the loaded staggered-column box magazine. Capacity was supposedly 32 rounds, though experienced servicemen rarely loaded more than 27; not only were the last five difficult to force into the magazine, but constantly carrying the gun with a fully laden magazine weakened the magazine-follower spring and reduced reliability. Reducing the magazine capacity prolonged the effective life of the spring by reducing the load.

Production of the MP.38 began in the Erma factory in the summer of 1938, continuing into mid-1940. Guns generally display the manufacturer's code '27', though a few assembled concurrently with the earliest MP.40 are coded 'ayf'. MP.38 may be encountered with the auxiliary cocking-handle safety introduced with the perfected MP.40, permitting the bolt to be locked into the receiver in its forward position. These were known as MP.38/40.

The improved Maschinengewehr 40 (MP.40) appears to have been accepted in April 1940. Problems had been encountered with the older pattern and, as so many minor changes were being suggested, the HWaA adopted a 'new' pattern. Many changes were made to the ejector and the magazine-catch assembly, while fluting was omitted from the receiver, and the grip and sub-frame extension were pressed from steel rather than cast from aluminium. The barrel collar was modified; the barrel-stop was changed to formed steel from compressed fibre; and changes were made to the recoil-spring unit. Several differing magazine housings have been identified, the earliest being smooth and the later ones ribbed.

Experience in Poland showed that the safety system needed to be modified so that the bolt could be locked forward: the new cocking handle simply engaged a



**118 RIGHT**

A longitudinal section of the MP.38, showing the Vollmer-patent telescoping mainspring unit.

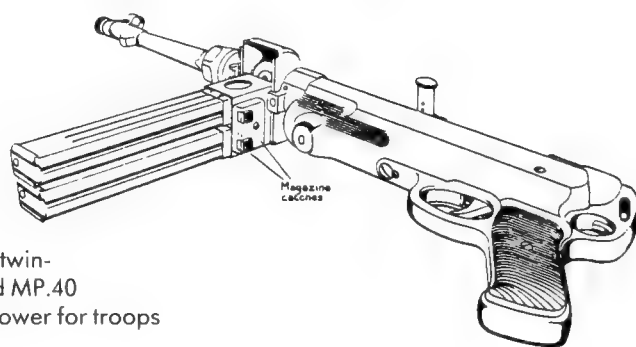
semicircular cut-out in the front upper edge of the cocking slot. These guns were officially designated 'MP.40/I', many older MP.38 and MP.40 subsequently being modified by exchanging the cocking handle and cutting the engagement notch in its slot.

Once mass production got underway, it was immediately evident that Erma ('27' and 'ayf') could not cope with demand. Steyr-Daimler-Puch was recruited to make the MP.40 in the autumn of 1940 – its products being coded '660' or 'bnz' – while C.G. Haenel of Suhl ('fxo') joined in 1942. Production of the submachine-guns relied heavily on sub-contractors, particularly for the large pressings; consequently, the marks of Merz-Werke of

Frankfurt am Main ('cos') and National Krupp Registrier-Kassen GmbH of Berlin-Neukölln ('cnd') will be found on components. Total production is unknown, though more than a million guns were made in 1940-4.

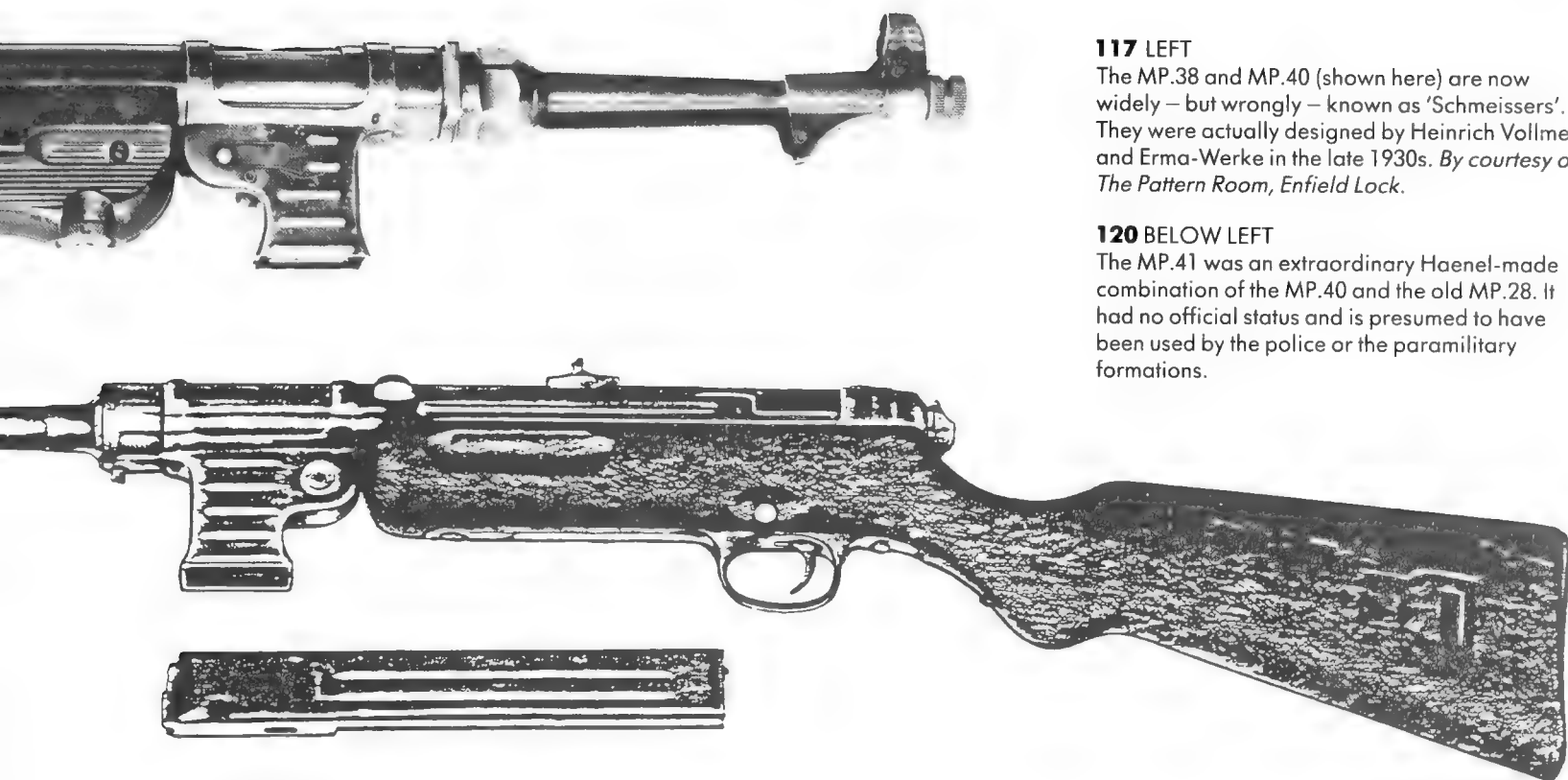
## MP.40 VARIANTS

A dual-magazine MP.40, or MP.40/II, apparently made by Steyr in 1942-3, had two standard magazines side-by-side in a special magazine housing. This system appears to have reached limited production status, but the additional weight and complexity prevented universal



**119**

The MP.40/II, shown here, was a twin-magazine version of the standard MP.40 intended to provide greater firepower for troops on the Russian Front.

**117 LEFT**

The MP.38 and MP.40 (shown here) are now widely – but wrongly – known as ‘Schmeissers’. They were actually designed by Heinrich Vollmer and Erma-Werke in the late 1930s. *By courtesy of The Pattern Room, Enfield Lock.*

**120 BELOW LEFT**

The MP.41 was an extraordinary Haenel-made combination of the MP.40 and the old MP.28. It had no official status and is presumed to have been used by the police or the paramilitary formations.

adoption. The gun was developed specifically for the Eastern Front, where the German troops were facing Russian PPSH submachine-guns with 70-round drum magazines.

Hybrid Maschinenpistolen 41 combined the receiver and barrel of the MP.40 with the stock and trigger of the MP.28. The MP.41 measured 864mm overall, had a 250mm barrel and weighed 4.37kg loaded; cyclic rate was about 500rpm. Its origins remain mysterious; it is fashionably supposed to have been produced for a ‘friendly foreign power’, but Haenel may simply have been ridding itself of superfluous MP.28 components. The MP.41 bears no special marks, apart from those of Haenel and the principal sub-contractor Merz-Werke.

## SIMPLIFIED DESIGNS

The MP.40 was made until the very end of the war, though manufacturing quality declined appreciably in the last months of 1944; 1945’s production was characterized by a particularly high rate of failure at final inspection. As the war progressed, the emphasis shifted from quality to

quantity; even though the MP.38/MP.40 series had been designed specifically for volume production, further simplifications were made. Guns made at Steyr from the autumn of 1943 onwards, for example, had integral frame and receiver-cap construction and – eventually – non-telescoping mainsprings made simply by cutting damaged, worn-out MG.42 springs in half. Though these expedients worked, cyclic rate was unpredictable and could rise as high as 1,000rpm.

Erma-Werke had produced a prototype all-metal submachine-gun in 1943 (the so-called ‘EMP44’), but it had been rejected by the HWaA. Only a handful of guns was completed before the project was abandoned. However, the EMP44 was an interesting design, with a double magazine unit and a flip-over sight in a prominent housing above the magazine feedway. It is now difficult to decide whether the gun would have been refined had it reached production status, or was a special-purpose design whose hollow tubular pistol grip was an integral part of a mount.

Though the MP.40 was reasonably simple, captured Sten Guns had shown the Germans that submachine-guns could be produced with almost the ultimately

crudity...yet still work acceptably. The first German attempt to copy the Sten was the so-called Gerät Potsdam, a precise copy of the Sten Mk II – even to the minor proof and inspectors’ marks – developed by the Mauser-Werke Oberndorf factory as project V.7081, apparently for the Reichssicherheitshauptamt. The drawings had been completed by October 1944, production of the Mauser guns commencing in November and finishing in January 1945. 28,000 guns were to be issued to pro-German forces behind the Allied lines, but Mauser made only 10,000 of them.<sup>3</sup> Assuming contracts were completed, Haenel and Sauer may have been the other contractors. Though Gerät Potsdam guns were subsequently issued to the Volkssturm and other emergency units attempting to defend the Reich to the bitter end, they never fulfilled the role for which they had been conceived.

Concurrently with work on Gerät Potsdam, Mauser modified the Sten design so that it could be made by metal-working companies with the most meagre equipment. Known as Project V.71083, the resulting MP.3008 or ‘Gerät Neumünster’

3. It is often claimed that Mauser made between 25,000 and 28,000 Geräte Potsdam. However, postwar interrogation of high-ranking Mauser personnel failed to elicit any figures greater than 10,000.

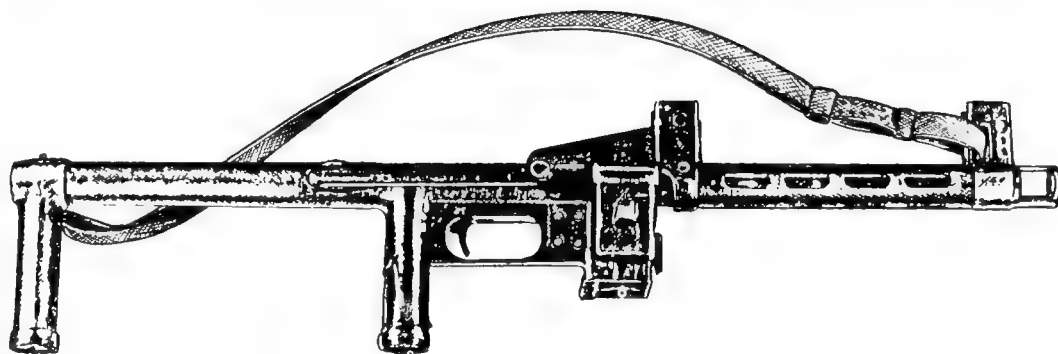
into immediate production in the autumn of 1944. However, none of the 50,000 expected in December were delivered and the project was taken over by Sonderkommission Waffen 12 in January 1945.

Work was entrusted to companies with no previous experience of gunmaking. Despite optimistic predictions that monthly production, initially set at 1,000 guns per plant, would rapidly reach 200,000, it is believed that less than 10,000 guns were accepted before the end of the war. Several differing patterns have been identified, which indicates the degree of latitude that had to be built-in to the design.

The MP.3008 was a near facsimile of the Sten Mk II, but had a vertical magazine (shared with the MP.40) and a permanently-emplaced trigger unit with the pins efficiently staked. In addition, a cross-bolt selector ran through the trigger housing above and ahead of the trigger guard. When pushed towards the right it permitted semi-automatic fire; when pressed back towards the left, the gun fired fully automatically. The stock was originally a skeletal pattern, but some guns were made (apparently by 'tjk') with a reinforced tubular strut. A typical gun measured 800mm overall, had a 200mm barrel and weighed 2.95kg unladen. The guns were usually very poorly made, with phosphated components and brick-red or black stove-enamelling on the barrel, receiver and frame.

Among the many companies reportedly involved in the MP.3008 programme were Mauser-Werke, Oberndorf ('byf' and 'svw'); Haenel, Suhl ('fxo'); Mitteldeutsche-Schweiz-Industrie, Weissenfels; Frebel, Oldenburg; W.J. Hölzen, Löhne; Carl Eickhorn Solingen ('cof'); Gustav Appel, Berlin; Walter Steiner Eisenkonstruktion, Suhl ('nea'); Blohm & Voss, Hamburg; and Gottfried Linder AG, Bremen. Unidentified codes 'rde', 'tjk' and 'twv' have also been found.

The status of some of these in relation to the MP.3008 project is questionable. No guns have even been reported with Mauser or Haenel markings, the former being involved with 'Gerät Potsdam' rather than the MP.3008; and those attributed to Blohm & Voss are justified only by the appearance of a 'B&V' trademark on the frame of a very non-standard gun.



Steiner's MP.3008 may be distinguished from the others by the knurled cocking handle and a flat cross-brace inside the skeletal butt-frame.

Requests that the MP.3008 should be tested as a grenade launcher, apparently made by the RSHA, were initially treated with derision. However, trials undertaken in January 1945 with specially-loaded 9mm Pl.Patr.08 showed that, despite its crudity, the MP.3008 was quite strong

#### 121 ABOVE

The uniquely tubular EMP44 was an unacceptable answer to calls for a simple submachine-gun that could be made by small or poorly equipped metalsmiths. Probably less than twenty were made. *Author's archives.*

enough to project grenades an appreciable distance. The major problem was that the pre-rifled ammunition tended to twist the gun in the firer's hands, making firing unnecessarily tiring.

## Captured guns

As submachine-guns were not especially popular in pre-1938 Europe, comparatively few were captured prior to the invasion of Russia in 1941. The seizure of Austria had provided quantities of Soltorn-pattern guns, issued to the Wehrmacht and police as Maschinenpistolen 30 (ö) and 34 (ö), but these have been described in the previous section.

Czechoslovakia provided small quantities of the 9mm ZK 383, a sturdy if conventional gun that had entered limited paramilitary service in 1937. Patented by Josef and František Koucký in 1933 and made by Zbrojovka Brno, the ZK 383 was an interesting selective-fire blowback – firing from an open breech – with an optional bolt-weight that could reduce the cyclic rate from 700 to 500rpm. The standard ZK 383 (though not the police ZK 383P) had a folding bipod that swung back into the fore-end. As the barrel could be exchanged very easily, the provision of the bipod was not the anachronism it initially seemed; the ZK 383 could deliver a greater volume of fire than most comparable guns, provided spare barrels were accessible. The gun measured about 875mm overall, had a 325mm barrel and

weighed 4.83kg with a laden 30-round box magazine. Feed was horizontally from the left. Quality was excellent and the gun was popular with the pro-German Czech SS units it equipped. Remaining guns from seized Czech stores were passed to Bulgaria.

Belgian 'Mi.Schmeisser-Bayard Mle.34', facsimiles of the MP.28 chambering 9mm Pist.Patr.08, were assimilated as MP.740(b). France was re-equipping with the 7.65mm MAS 38, but only limited quantities had reached the armed forces by 1940. Most of these remained in Vichy hands; however, the German police received small quantities of ex-French 'PM Vollmer Erma' (virtually identical with the German MPE), which served as Maschinenpistolen 704(f).

Russia proved the first major source of captured submachine-guns. Though small numbers of the 7.62mm Degtyarev-designed PPD 34/38 and PPD 40 blowbacks were taken (known to the Wehrmacht as MP.715[r] and 716[r] respectively), the most important was the blowback PPSH, or MP.717(r). Designed by Georgii Shpagin and adopted prior to the German invasion in December 1940,



**122, 123 ABOVE AND LEFT**

The 7.62mm Russian PPSH (or MP.717[r]) was greatly favoured by the German troops during the opening phases of Operation 'Barbarossa': MP.38 and MP.40 were in short supply, and the 71-round magazines, though they made the Russian guns heavy, conferred a great firepower advantage over the Germans' nominally 32-round boxes. After experiencing the reliability problems associated with the drum, however, the Germans converted many of the captured PPSH to 9mm calibre... and the standard MP.38/MP.40 magazines! *By courtesy of The Pattern Room, Enfield Lock.*

engineering problems delayed production of the PPSH until the autumn of 1941. Total deliveries of submachine-guns in the year amounted to less than 100,000 (6,000 of which were PPD), but production accelerated rapidly; by 1945, annual production had reached 2.5 million. The PPSH was greatly appreciated for reliability, belying its crude appearance, and the 71-round drum magazine: though heavy, this gave the Russian soldier an appreciable advantage over Germans armed with the MP.38 or MP.40.

So many PPSH were captured that the Germans converted many to fire 9mm Pist.Patr.08, designating them MP.717(r) umg. or MP.41(r) umg. The feedways of these guns were altered for the standard MP.38/MP.40 box magazines.

A few 1928-model Thompsons ('MP.760[r]') were also taken from the Russians, who had received them during Lend-Lease together with Reising Models 50 and 55 and the UD42. Total receipts of US submachine-guns amounted to more than 112,000 during the Second World War.

The Thompson, a complicated and expensive design incorporating the so-called 'Bliss Principle' delay system, was generally found with a conventional

wooden fore-end with a grasping groove, and a 50-round drum magazine. The Reising, for which patent protection was sought in June 1940, were designed by Eugene Reising; about 100,000 were made by Harrington & Richardson in 1941-5, but the selective-fire blowback system was complex and unreliable. The guns had cocking slides under the fore-end and a sliding safety/selector on the right side of the receiver. They fired from a closed breech, measured 35.6in overall, had 11in barrels and weighed 8.15lb loaded. The detachable box magazines held twenty rounds and cyclic rate was about 550rpm. The Model 50 had a conventional stock, whereas the Model 55 (which also lacked a compensator) had a flimsy folding wire butt and a pistol grip.

The UD M42, designed by Carl Swebiilius of High Standard in 1940, was made by Marlin Firearms Company for the government-owned Defence Supply Corporation. Most of the 15,000 made in 1942-4 went to the OSS or, eventually, to the Russians. The UD was a selective fire blowback firing from an open bolt, with a non-reciprocating cocking slide. A combined safety/selector lay on the right side of the trigger housing, a hold-open was fitted, and the back sight was an unusual elevating-bar pattern. The UD, which measured 31.8in overall, had an 11in barrel and weighed about 10lb loaded. The box magazine held twenty rounds and the cyclic rate was approximately 700rpm. Unlike the Reising, the UD was sturdy, accurate, very efficient and greatly appreciated by its users. However, as it was comparatively difficult to make, it was passed over in favour of the abortive M2 and then the M3 'Grease Gun'.

Possibly the best-liked submachine-gun was the Italian Beretta Mo.938A, known to the Germans as the Maschinenpistole 739(i). Designed by Tullio Marengoni and introduced in 1935 as a semi-automatic carbine, the Beretta reappeared as a twin-trigger submachine-gun at the beginning of 1938. The original version had a slotted barrel jacket and a simple compensator, but, by the time guns were purchased by the Germans, the production pattern had acquired a pierced jacket and an effectual four-baffle compensator. The Mo.938A measured 946mm overall, had a 315mm barrel and weighed a little under 5kg loaded. Its cyc-

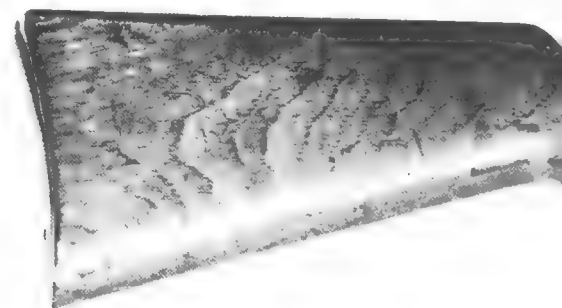


#### 124 ABOVE

A Fallschirmjäger cameraman is protected by a colleague carrying an early Beretta Mo.938A submachine-gun (MP.739(i)). By courtesy of the Bundesarchiv; negative BA585/1846/13a.

#### 125 RIGHT

Also known by the Fremdgerät designation MP.739(i), the Italian Beretta Mo.938A was among the best of all the impressed submachine-guns – sturdy, reliable and extremely accurate. By courtesy of The Pattern Room, Enfield Lock.



lic rate was about 600rpm, though single shots could be fired with the front trigger. Most guns had a radial safety on the left side of the stock above the triggers and a blocking-bar behind the rear trigger to prevent accidental automatic fire. Widely carried by paratroops and Waffen-SS, often in preference to the MP.38 and MP.40, the Beretta was sturdy, reliable and regarded as supremely accurate for a gun of its class.

German forces in Italy also received small quantities of the FNAB gun, made by Fabbrica Nazionale d'Armi of Brescia in 1943-4. The FNAB was a complicated retarded blowback, firing from a closed breech, with a folding magazine housing and a radial selector on the left side of the frame above the grip. It was regarded as well made and accurate, but unnecessarily complicated for a submachine-gun. Only about 7,000 were made.

Co-belligerent forces provided small quantities of Suomi m/31, Hungarian 39.M and Romanian Orita guns, which found

their way into the Wehrmacht inventory as the fronts collapsed in 1944-5.

Designed by Aimo Lahti, the Suomi was a selective-fire blowback, the control lever sliding through the front of the trigger guard. Made by Oy Tikkakoski (and under licence by Husqvarna, Madsen and Hispano-Suiza), the m/31 was an influential but very traditionally made design. The service weapon of virtually all Scandinavia, plus Spain, Bolivia and elsewhere in South America prior to 1939, the Suomi was strong and reliable. Overall length was about 870mm, with a 315mm barrel, but was very heavy: with a loaded 71-round drum magazine, it weighed more than 7kg. A selection of box or drum magazines could be obtained, but the largest drum was the most popular.

Credited to Kiraly, the Hungarian 39.M (fixed stock) and 39.AM (folding stock) submachine-guns were traditionally made, accepted bayonets, and had a unique two-piece bolt retarding system. Made by the Danuvia factory in Budapest.

the Kiralý guns had rotary selectors and folding vertical magazines. Only about eight thousand were made before the advent of the similar-but-simpler 43.M. The 39.M measured 1,048mm overall, had a 500mm barrel and weighed 4.6kg with a loaded 40-round box magazine. Unlike most of the standard German guns, but in common with the Austrian army MP.34, they chambered the 9mm Mauser cartridge rather than the ubiquitous 9mm Parabellum. Owing to their weight, long barrel and exemplary standards of manufacture, they were extremely accurate and pleasant to fire. Only small numbers found their way into German hands after

the Hungarian troops on the Russian Front collapsed, and most guns were ultimately lost in Russia.

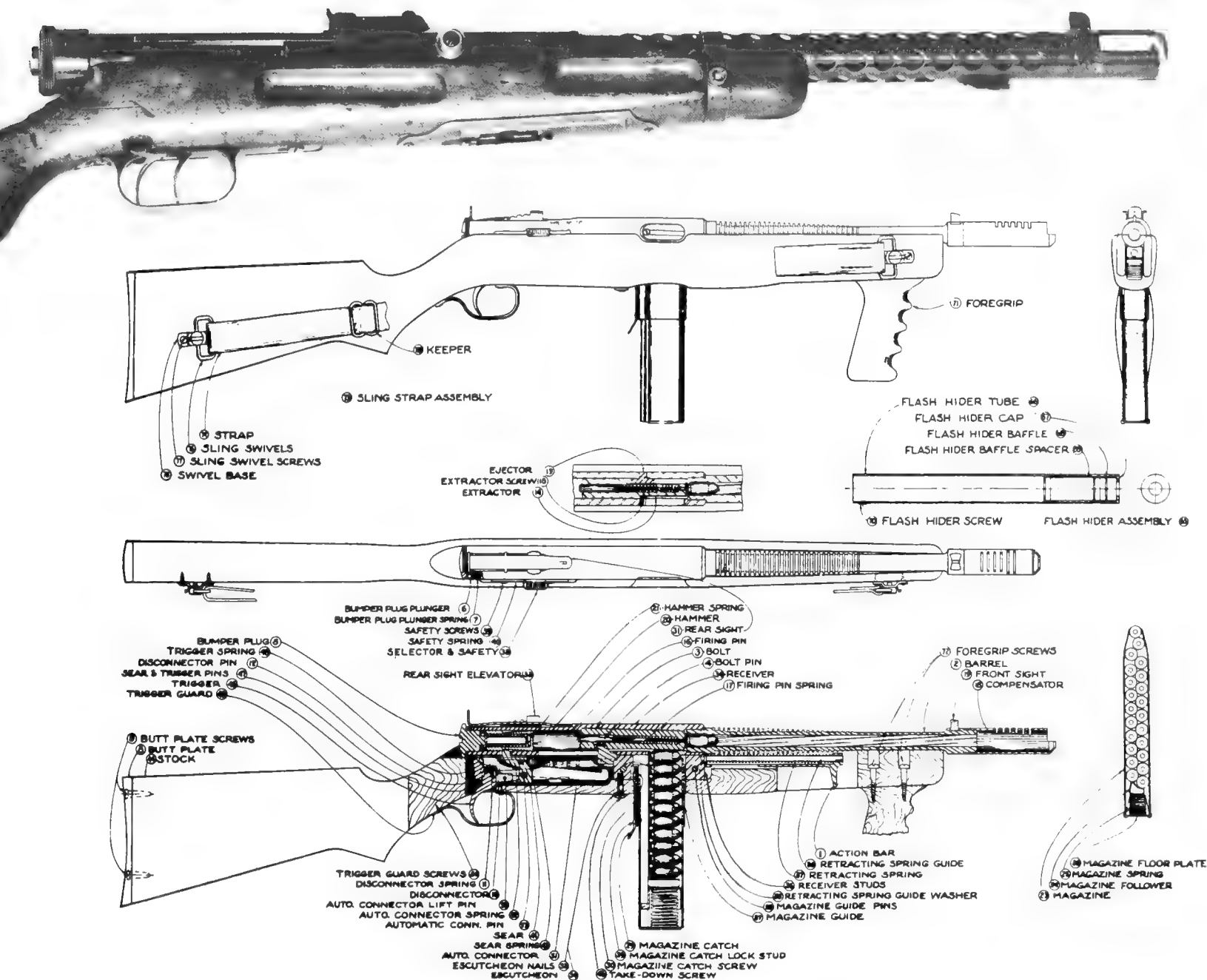
The Romanian M1940 and M1941 Orita submachine-guns, with fixed wood and folding metal stocks respectively, were designed by Leopold Jaška and made by CMC at Çugir. The M1941 bears a superficial resemblance to the MP.38, but has a crossbolt safety ahead of the trigger, a sliding selector on the right side of the receiver and a unique tangent sight. It is believed that about 25,000 Oritas were made, but most were subsequently lost with the Romanian troops fighting alongside the Germans on the Russian Front.

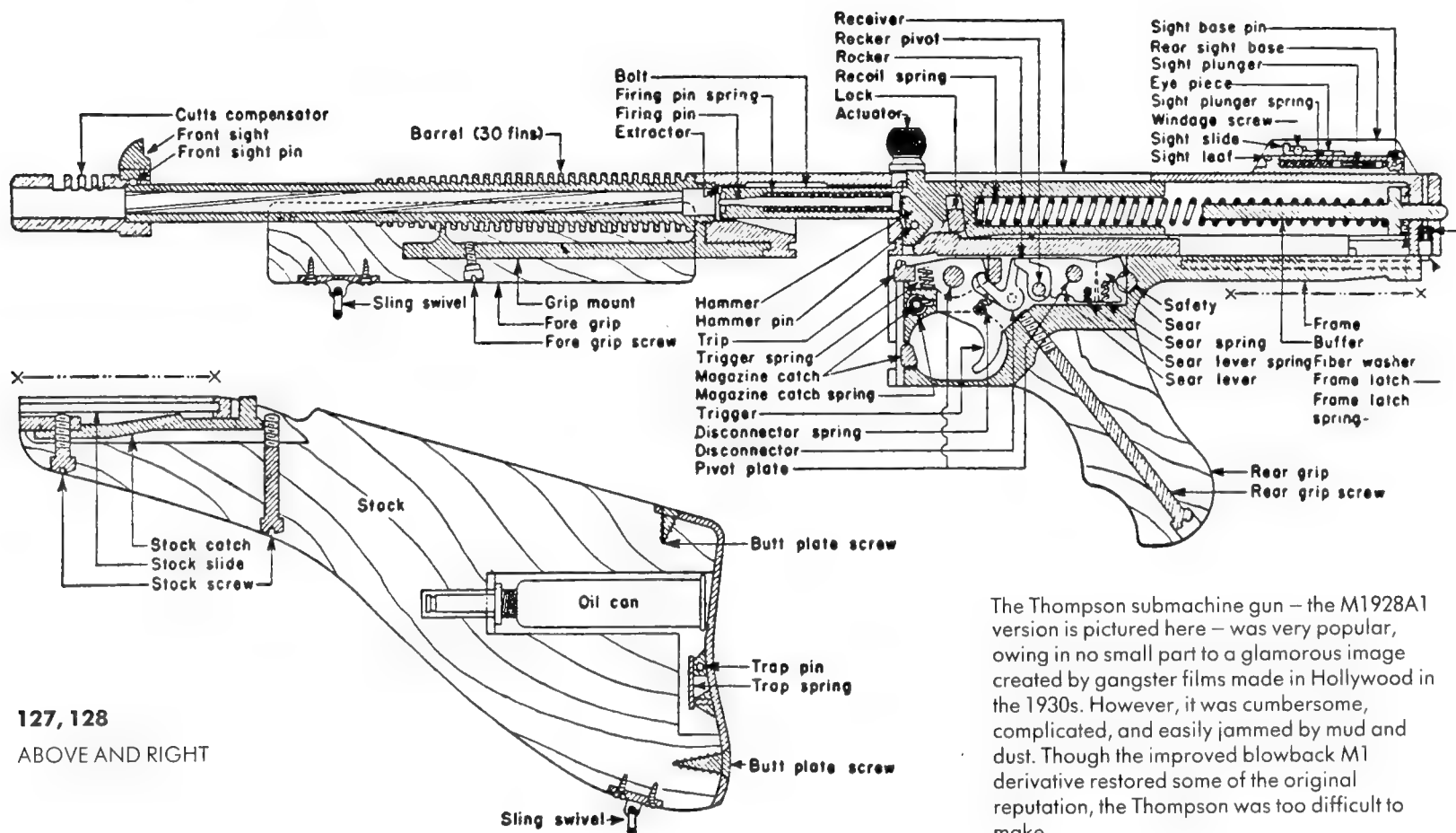
Lanchester, Sten, Thompson M1 and M1A1, and US M3/M3A1 'Grease Guns', captured from the Western Allies, were reissued in the last days of the war. The British guns were particularly useful, as they could fire standard 9mm pistol ammunition.<sup>4</sup>

4. British 9mm cartridges, loaded with different propellant, generated different pressures and were not always as reliable in German guns as the British originals

## 126 BELOW

General arrangement and sectional drawings of the standard Reising Model 50 submachine-gun, made by Harrington & Richardson. *Author's archives.*



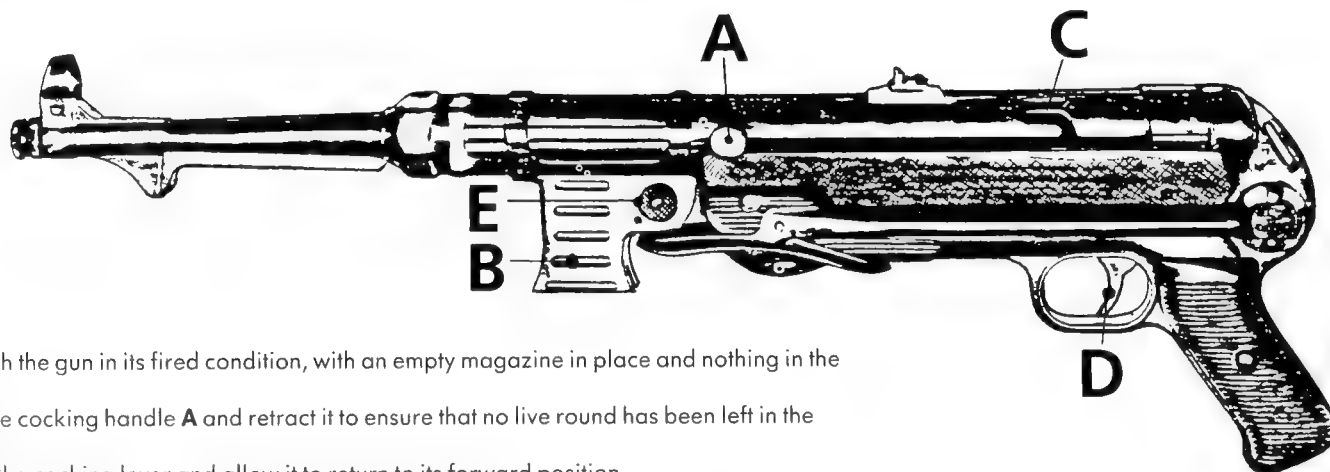


127, 128

ABOVE AND RIGHT

The Thompson submachine gun – the M1928A1 version is pictured here – was very popular, owing in no small part to a glamorous image created by gangster films made in Hollywood in the 1930s. However, it was cumbersome, complicated, and easily jammed by mud and dust. Though the improved blowback M1 derivative restored some of the original reputation, the Thompson was too difficult to make.

## How to fire the MP.38 and MP.40



Starting with the gun in its fired condition, with an empty magazine in place and nothing in the chamber:

Grasp the cocking handle **A** and retract it to ensure that no live round has been left in the chamber.

- Release the cocking lever and allow it to return to its forward position.
- Insert a loaded magazine in the feedway **B** and press it home, ribs on the magazine preventing overtravel. The magazine should lock in place.

Grasp the cocking handle **A** and retract it until it is held by the sear, taking care *not to release it accidentally* as the gun will fire if the bolt runs forward. (Later guns, plus some earlier ones that have been modified, have a bolt-locking catch on the cocking handle. This must be released from its seat in the cocking-handle slot before the bolt may be retracted.)

- To fire, simply press the trigger **D** to release the bolt. The gun will continue to fire as long as cartridges remain in the magazine.

When the magazine is empty, the bolt remains closed.

- Press the magazine catch **E**, withdraw the magazine, reload and begin the sequence again.
- Note: additional security is provided by hooking the cocking handle up into the 'safety slot' **C** midway between the back sight and the receiver end-cap. This arrangement should not be trusted, as the handle may jar out of engagement should the gun be dropped



# FIVE

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## THE RIFLES

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The bolt-action and semi-automatic shoulder weapons of the Third Reich, from the Gew.98 and Kar.98k to the StG.45.



# Rifles

The principal German bolt-action rifles of the Third Reich derived from the Gewehr 98, adopted on 5 April 1898. Its action was a standard Mauser turning bolt, with a third (or 'safety') lug and an internal five-round box magazine loaded either from a charger or with loose rounds. In an attempt to isolate the effects of the bayonet from the rifle barrel, the Gew.98 had a sturdy twin-band noscap supporting an unusually long attachment bar. The bayonets, therefore, have an elongated attachment slot to impart sufficient rigidity to the mount without requiring a muzzle ring. The original 8mm Patrone 88 was replaced by the 8mm S-Patrone, adopted on 3 March 1903.

Gewehre 98 were made by the four state-owned arsenals – Amberg, Danzig,

Erfurt and Spandau – as well as by Waffenfabrik Mauser AG of Oberndorf; Deutsche Waffen- und Munitionsfabriken ('DWM') in Berlin; and Simson & Co., C.G. Haenel Waffen- und Fahrradfabrik and V.C. Schilling & Co. in Suhl. Small quantities were also made by Waffenwerk Oberspree, Kornbusch & Co. in Niederschönweide, near Berlin, but the company was acquired by DWM in 1916.

Rifles retained by the Reichswehr after the end of the First World War were modified by substituting a simple tangent-leaf sight for the Lange tangent pattern; replacing the old swivel-bearing barrel band; exchanging the Klammerfuss under the butt with a lateral sling slot; and turning the bolt handles down into a stock recess. These were designated Ka-

rabiner 98b, though still full-length rifles. They generally display '1920' or '1921' permission marks,<sup>1</sup> either in addition to or instead of the original dates.

Several unsuccessful carbines had been produced early in the twentieth century, but the excessive flash and muzzle-blast of the Patrone 88 or S-Patrone caused the original short-barrelled Kar.98a to be abandoned. The replacement was a much longer 'carbine' – a short rifle comparable with the British SMLE – called the Karabiner 98 mit Aufplanz- und Zusammensetzvorrichtung ('Kar.98 AZ'). Adopted on 16 January

1. These were applied under the supervision of the Inter-Allied Military Control Commission, to show that they had been properly inventoried. The intention was to prevent the Germans retaining unnecessarily large stockpiles of weapons; it was a failure, as the latter were simply well hidden.



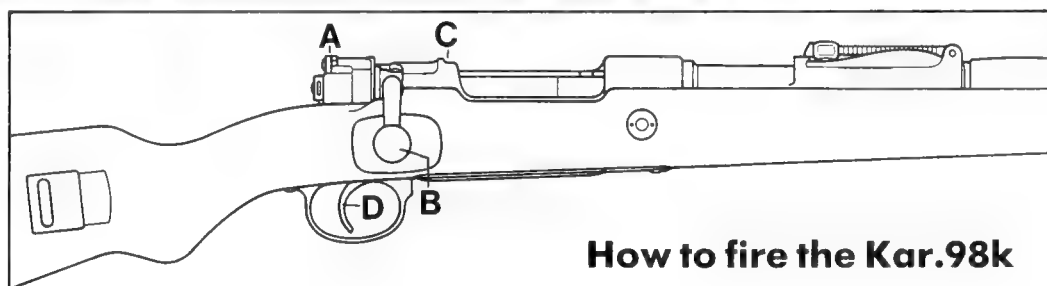
**130 ABOVE**

Men of 7.Kavallerie-Regiment sit impassively while awaiting inspection on parade, c.1936. Note the standard Kar.98k with wood-gripped S.84/98 bayonets, and a solitary MG.13 carried by the soldier fourth from the right. *Courtesy of Brian L. Davis.*

1908, this had a full-length handguard above the barrel, a simple tangent-leaf back sight, a unique hinged nose-cap and an ultra-short muzzle. The front sight had prominent protectors; a piling rod protruded beneath the nosecap; and a hemispherical bolt handle turned down into the stock, its back face being chequered to

**129 LEFT**

'Im Schützengraben' ('in the trenches'): a postcard published by Schaar & Dathe KG, Trier, with the permission of the military censor. It was sent to Ludgerstal in Schlesien by a member of 6.Kompagnie, II.Bataillon, 365.Infanterie-Regiment, on 25 March 1917. The trench is typical of those that were hurriedly constructed in the early Eastern campaigns, but not of the more substantial fortifications common on the Western Front. *LPI archives.*

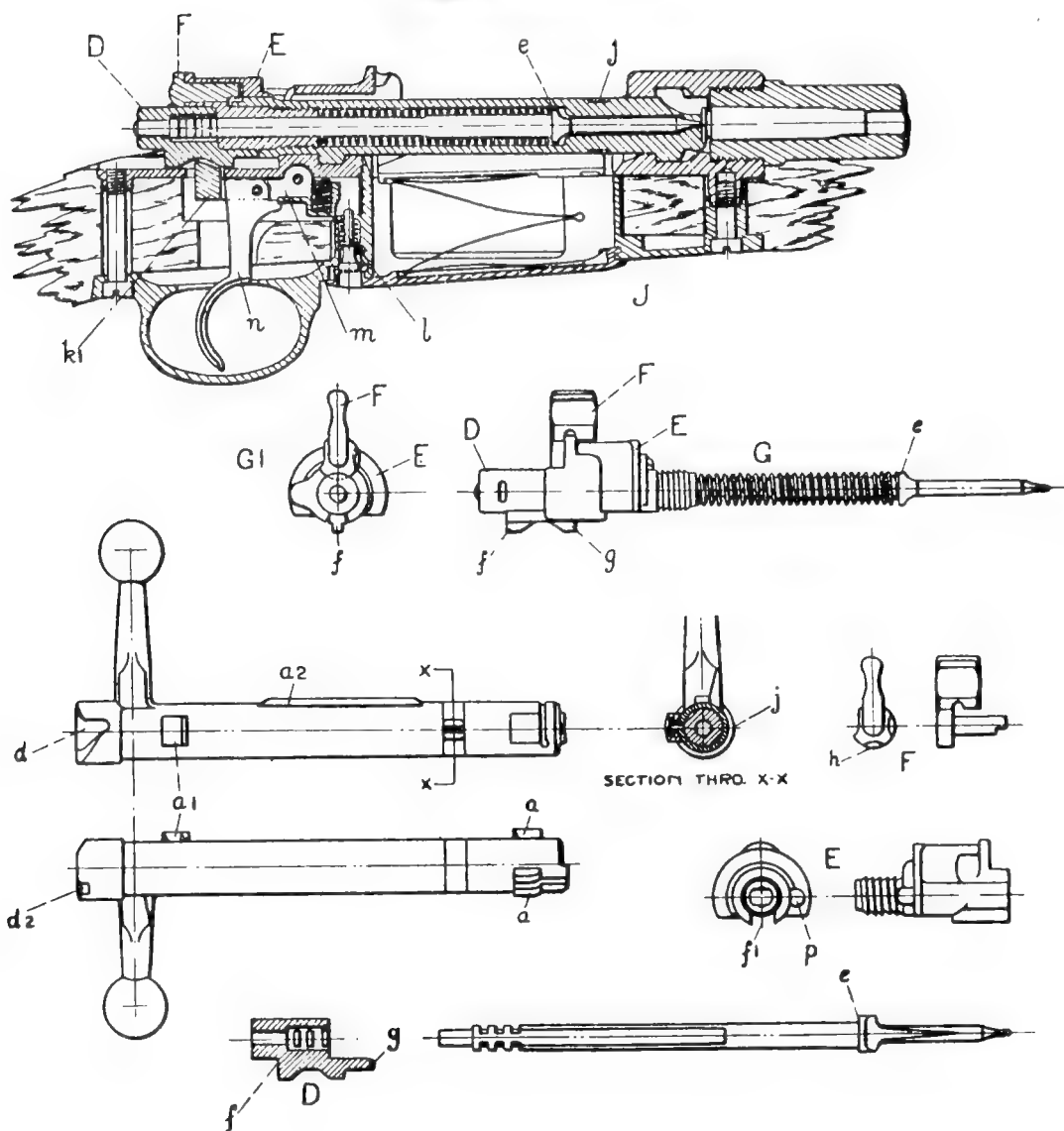
**How to fire the Kar.98k**

Starting with the gun in its fired condition, with an empty magazine in place and nothing in the chamber:

- Ensure the safety catch **A** is in the off position, rotated toward the left side of the cocking piece, otherwise the bolt cannot be opened.
- Lift the bolt handle **B** and retract the bolt until it will travel no farther, being held by the stop.
- Take a five-round charger, insert it in the guides **C** milled in the front edge of the receiver-bridge (ahead of the bolt handle slot) and press the cartridges downwards with the thumb into the magazine.
- Alternatively, press five loose rounds individually into the magazine.
- Close the bolt and turn the handle down into its seat, automatically ejecting the empty charger if it has been left in the guide.
- As the closing bolt has automatically loaded the first round, the gun may be fired by squeezing the trigger **D**.
- Alternatively, the safety catch may be applied by rotating it towards the right, locking the bolt and trigger mechanism.
- When the last round has been chambered, fired and ejected, the magazine follower will prevent the bolt closing unless it is pressed downwards with the thumb while pressing slowly forward on the bolt.

**131, 132 ABOVE**

The standard German infantry rifle was the Kar.98k (top), a shortened version of the original Gew.98 of 1898 (bottom). The stamped nosecap, one-piece nosecap/band spring and sheet-steel buttplate show that this Kar.98k is a Kriegsmodell, probably dating from 1943. By courtesy of The Pattern Room, Enfield Lock.

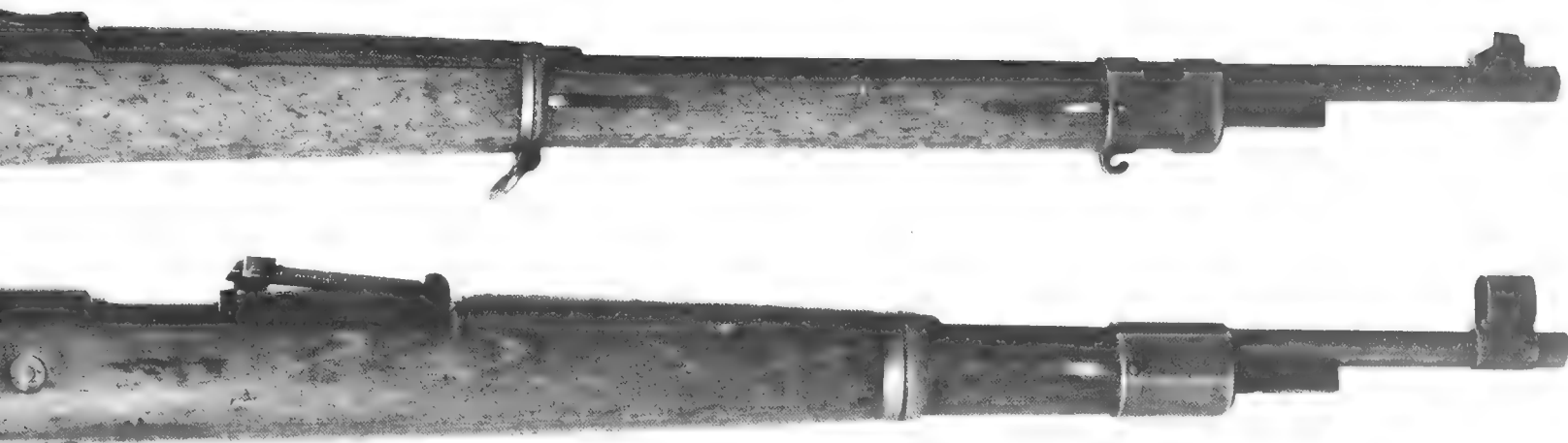
**133 LEFT**

The so-called 'M1904' Mauser was essentially similar to the Gew.98, incorporating the third or safety lug turning down into the action behind the magazine well. Its construction is typical of almost all but a handful of post-1898 Mauser rifles. From the Text Book of Small Arms, 1929; Crown Copyright.

improve grip. The Kar.98 AZ served throughout the First World War with only the minor modifications necessary to facilitate mass production. No changes were made to the guns retained during the Reichswehr, though they were renamed Karabiner 98a to distinguish them from the full-length 'Kar.98b'.

Karabiner 98a and 98b remained the principal service weapons until the adoption of the Karabiner 98k in 1935. The Kar.98k superficially resembled the full-length Kar.98b, though appreciably shorter, and accepted the Seitengewehr 84/98. The standard cartridge remained the 8mm S-Patrone (redesignated '7.9mm'), together with the heavyweight sS-Patrone introduced principally for machine-gun use in 1918. The Kar.98k was made in colossal numbers by legions of contractors. In addition to two Mauser-owned factories in Oberndorf am Neckar





('S/42', '42', 'byf' and 'svw') and Berlin-Borsigwalde ('S/243', '243' and 'ar'), rifles were made by Sauer & Sohn of Suhl ('S/147', '147' and 'ce'), Berlin-Lübecker Maschinenfabrik of Lübeck ('S/237' or '237'), Waffenwerk Brünn AG of Brno ('dot'), Fabrique Nationale d'Armes de Guerre of Herstal-lès-Liége ('ch'), Feinmechanische Werke GmbH of Erfurt ('S/27', '27' and 'ax'), Gustloff-Werke of Weimar ('bcd') and Steyr-Daimler-Puch AG of Steyr/Oberdonau ('660', 'bnz').

The standards of production fell notably as the war progressed, leading to the so-called Kar.98k Kriegsmode. The principal distinguishing characteristics included stamped nosecaps, barrel bands and butt-plates, crudely finished trigger-guards and thinly varnished stocks. Most – but by no means all – Kriegsmodele display laminated stocks, the result of trials that had stretched through the 1930s. Though plastic-coated metal stocks had been a failure, plywood laminates proved to be more resistant to warping than the conventional one-piece patterns; as a bonus, the wood did not require lengthy maturing and there was much less waste. It has been estimated that only two in every hundred laminated stocks failed inspection, compared with ten solid ones.

Variants of the Kar.98k included the Gebirgsjäger-Karabiner 98k, a semi-experimental pattern with a large cast-steel plate on the left side of the butt. There were also several Fallschirmjäger Karabiner 98k (paratroop rifles), at least

one survivor having a hinged butt and another a detachable barrel with an interrupted-screw joint ahead of the receiver.

The snipers' Zielfernrohr-Karabiner 98k (Zf-Kar.98k) was standard apart from its optical sight, though the guns were specially selected for their accuracy. The earliest combinations used the 4× Zf.39 made by Zeiss, Leitz, Goerz, Hensoldt and others; during the war, however, the smaller 1.5× Zf.40, Zf.41, Zf.41/1 and Zf.41/2 became increasingly common.

Zf.39 were accompanied by separate 'turret' mounts, on top of the receiver bridge and the chamber, or – more rarely – a one-piece twin-ring mount clamped onto a rail on the left side of the receiver. The 1.5× sights slid into a rail on the left side of the back sight, where they were retained by a spring-loaded catch. A few guns were fitted with the Zf.4 sight, developed for the Gew.43 (q.v.), in a special rearward-slanting twin-ring monoblock. The Zf.4 was noticeably shorter and stubbier than the Zf.39.

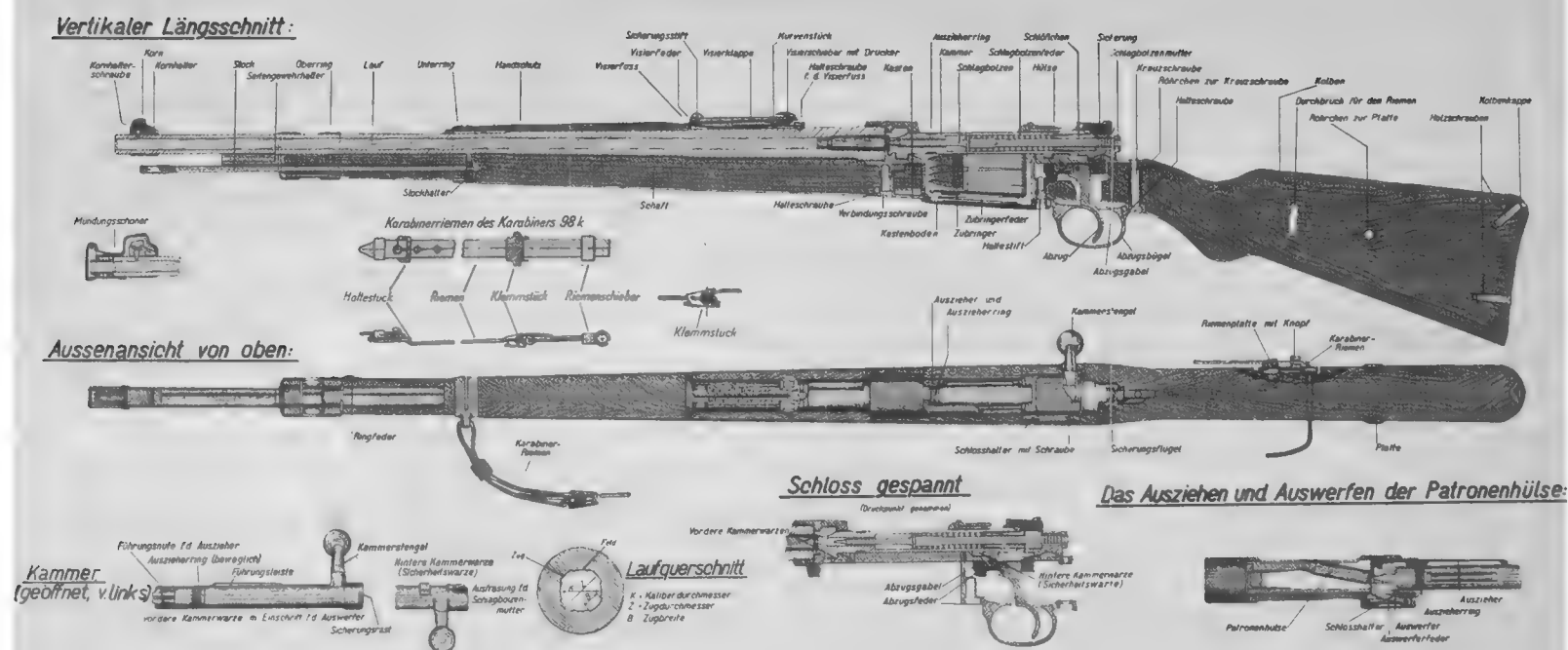
## THE VOLKSGEWEHRE

The final deterioration of the German bolt-action rifles was the ultra-crude Volksgewehr or "People's Rifle". The earliest apparently dates from the autumn of 1944, though specifications had been circulated some months previously. The goal was a simplified rifle that could be

made with a minimum of machine-time or raw material; the results included simplified Kar.98k developed by Mauser-Werke, Volkskarabiner 98 (VK.98) made by Steyr-Daimler-Puch (Code 'bnz'), Walther ('qve') and others, and the Volksgewehre contributed by many anonymous machine-shops. These guns all handled the standard 7.9mm S-Patrone and, excepting the final Volksgewehre, had conventional Mauser bolt actions. VK.98 had half-stocks, fixed-notch back-sights and roughly finished 'stepped' or cylindrical barrels. However, though their finish was notably rough, they were not as poorly made as the Volksgewehre. Chambering either the 7.9mm S-Patrone or Pist.Patr.43, the VG have been credited to Erfurter Maschinenfabrik B. Geipel GmbH 'Erma-Werke' ('ayf'), among others. Most featured stamped and welded receivers, and simple bolts with two – or fewer – locking lugs. They had plain cylindrical bolt handles made from bar-stock, roughly planed woodwork (often with separate butts and fore-ends), and accepted neither bayonets nor grenade launchers. Though standard Gew.43 box magazines were usually fitted, some of the last guns were single-shot only.

No official orders governing the introduction of these Volkswaffen have ever been found, though the HWaA was ordered to develop an effectual weapon. It is believed that this was the VK.98, and that most of the cruder guns were procured on a local basis; some may have been made by the manufacturers purely

## Der Karabiner 98<sup>k</sup>



for last-ditch local defence, without the knowledge of even the local Party officials.<sup>2</sup>

2. This would explain why some of the guns are so embarrassingly crude, even when made by Walther. It may also explain why at least one completely non-standard pattern of the so-called MP.3008 has been attributed to the Blohm & Voss shipyard.

### CAPTURED WEAPONS

In the period of comparative calm between the wars, the Germans had collected copious details of foreign matériel and published it in 'Liste der Fremdgeräte'. Huge numbers of captured rifles were taken into service during the Second World War; though the most important received German designations such as 'Gew.29/40', most were known simply by their Fremdgerät number. The 'Gewehr 261(b)', therefore, was the Belgian

Mle.89 Mauser rifle. The suffix letter merely identified the country of origin.

The Belgian Mle 89 (see below) was the first successful charger-loaded small-bore Mauser rifle. Though substantial quantities of the French service rifles were captured in 1940, most were subsequently returned to the Vichy Government. The Mle 74 (Gras) was an obsolescent 11mm single-shot bolt-action rifle; the 8mm Mle 86/93 (Lebel) had been the world's first successful small-bore rifle firing a cartridge loaded with smokeless propellant, but its under-barrel tube magazine was anachronistic by 1940. The 8mm-calibre Berthier was a much better design. Though its complicated bolt resembled the Lebel's, the magazine was a clip-loaded box. A series of successful Mosquetons (Mle 90 and Mle 92), plus the Mle 02 and Mle 07 colonial rifles, had persuaded the French

### 134 ABOVE

General-arrangement drawings of the Kar.98k and its principal components. From Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.

### 135 ABOVE RIGHT

A postcard from the 'Unser Heer' series, published by Frankh-Verlag of Stuttgart, showing infantrymen shouldering arms for the final part of their formal daily training before returning to their barracks. The card was sent from Freising to München in May 1937. *LPI archives*.

### 136 RIGHT

Gew.98-armed trainees under the guidance of the Marine-Lehr-Abteilung parade in front of their Kiel-Friedrichsort barracks in this postcard published by M. Dieterle & Sohn, Kiel, c.1935. Close inspection of the original suggests that the guns may have Lange-pattern tangent sights rather than the simpler leaf patterns fitted retrospectively to contemporary army Kar.98b. *LPI archives*.

### RIFLES IN POLICE SERVICE, 1943

**Belgian guns:** Gewehr 261(b), 262(b) and 263(b) – Mle 89, 35 and 89/36 Mausers.

**French guns:** Gewehr 241(f), the Mle 07/15 M 34 Berthier; Gewehr 301(f) and 303(f), the Mle 86/93 and 86/93 R 35 Lebel; Gewehr 304(f), the Mle 16 Berthier; Gewehr 361(f), the venerable Mle 74 Gras; Karabiner 552(f) and 553(f), the Mle 90 and Mle 92/16 Berthier carbines; and Karabiner 561(f), the Mle 74 Gras rifle.

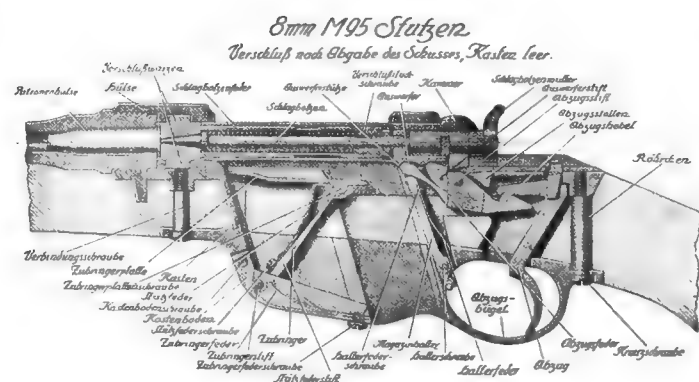
**Dutch guns:** Gewehr 211(h), the M1895 Mannlicher; Karabiner 413(h), the No.3 (O.M. and N.M.) carbine.

**Norwegian guns:** Gewehr 214(n), the Norwegian M1894 Krag-Jorgensen.

**Russian Guns:** Gewehr 252(r), 253(r) and 254(r), the obr.1891g Mosin-Nagant infantry, dragoon and cossack rifles; Selbstladegewehr 259(r), the SVT40 Tokarev; plus Karabiner 453(r) and 454(r), the obr.1910g and 'M1924/27' (obr.1938g?) Mosin-Nagant carbines.

authorities to standardize the Berthier for universal issue as the Mle 15. It had progressed to 'Mle 16' standards by the end of the First World War, but the French soon realized that their rifles lagged behind those of potential rivals. Adopting the charger-loaded 7.5mm MAS36 restored national pride, but the new rifles were only beginning to reach the army when the Germans invaded France.





Dr. 8 mm M 95 Stutzen

53

### 137 LEFT

The Austrian M 95 (Mannlicher) rifle, the short version of which was used by the German police in the Ostmark region, incorporated a straight-pull bolt and a clip-loaded magazine. From Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.

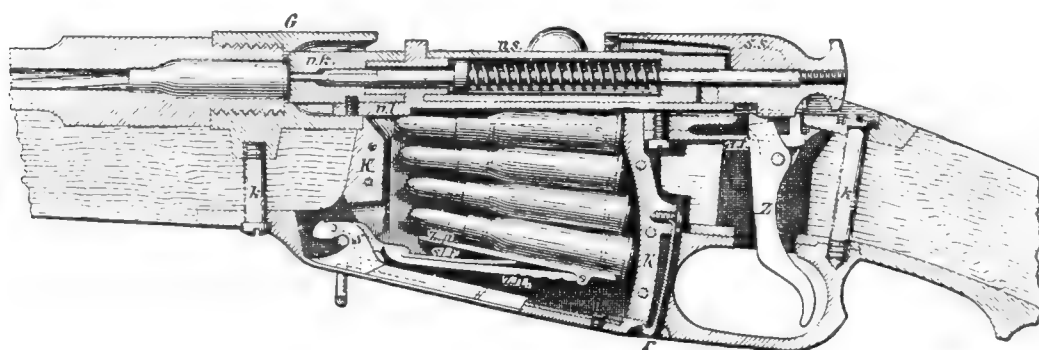
### 138 BELOW LEFT

Captured by the Germans in huge quantities, the Russian obr. 1891/30 (Mosin-Nagant) rifle was sturdy and dependable – though often poorly made.

Mannlichers were captured in quantity after the invasion of the Netherlands, but were generally retained for reserve, gendarmerie and police units serving in the Low Countries. The principal rifles were the 6.5mm M1895 and 7.9mm M1917, plus a handful of 6.5mm carbines. The turning-bolt rifles had distinctively-shaped projecting box magazines beneath their split-bridge receivers and a unique bayonet fixing system.

Norwegian Krag's were popular with pro-German defence forces and, it is said, Norwegian SS volunteers.<sup>3</sup> The principal rifle was the bolt-action 6.5mm-calibre

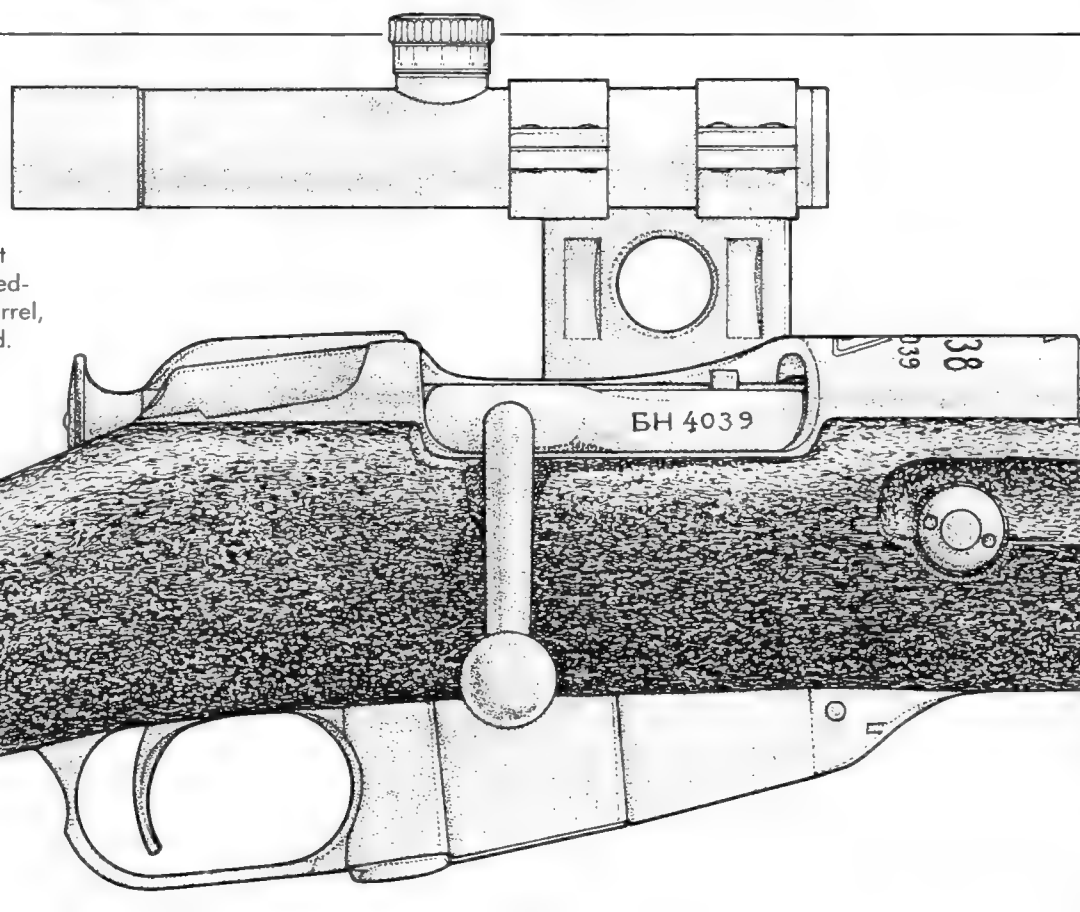
3. Most of these men would be armed with the Kar.98k, especially when serving outside Norway. Consequently, this oft-repeated claim should be treated with caution.



### 139 RIGHT

The breech of the obr. 1891/30 Mosin-Nagant rifle was most distinctive. Apart from the turned-down bolt handle to clear the optical sight barrel, this 1938-vintage sniper rifle is quite standard.

LPI archives; drawing by John Walter.







#### 140 ABOVE

Men of the Wehrmacht pose in front of a firing-range in this 1939-vintage photograph. Note that they have ex-Czech vz.24 rifles ('Gew.24[t]'), which may be distinguished from Kar.98k by the sling swivels on the butt-side. *LPI archives.*

m/1894, a sturdy gun with an unusually smooth action and an odd lateral magazine beneath the bolt. Unlike the Mausers, the Krag could be loaded with loose cartridges even when a round had been chambered. The Norwegians had also issued several carbines, but most were retained for the 'loyal' units of the Norwegian army.

Bolt-action Mosin-Nagants were captured in huge quantities during the early phases of Operation 'Barbarossa'. Most were obr.1891/30g, the Soviet derivative of the old Tsarist obr.1891g, but obr.1938g carbines were also collected in profusion. Smaller numbers of obr.1871g Berdans were seized from partisans, together with old Mosin-Nagants – including a few obr.1910g carbines. Though long, clumsy

and poorly made, the Russian rifles were very sturdy and surprisingly tolerant of sloppy manufacturing tolerances. Though they chambered an awkward rimmed 7.62mm cartridge, a unique interruptor in the magazine-well assured effectual feed. Smaller numbers of Simonov and Tokarev semi-automatics were also taken in the field and reissued to Wehrmacht troops (see AUTOMATIC RIFLES).

### NON-GERMAN MAUSERS

After the occupation of Austria, Czechoslovakia, Poland and Belgium, the Germans seized vast numbers of useful Mauser-type rifles similar to the Kar.98k.

The Gewehr 29/40 (ö) was a variation of the standard Austrian M1929 service rifle, apparently issued largely to the Luftwaffe. It was practically identical with the Kar.98k apart from its distinctive nose-cap, a handguard stretching from the receiver ring to the nosecap, and a pointed

Austrian-style pistol grip. Unlike the Austrian guns made prior to 1939, the 29/40 accepted the standard German service bayonet.

Czechoslovakia provided large numbers of the Gewehr 24(t), a designation that covered a selection of Kar.98k-type vz.24 and vz.24/30 short rifles made by Československá Zbrojovka in Brno, plus smaller quantities of the vz.98/22 and vz.98/29 long rifles, which approximated to the Karabiner 98b. No additional production was undertaken, however, as the Brno factory – officially renamed 'Böhmische Waffenfabrik' – was ordered to tool for the Kar.98k.

Officially adopted by the Wehrmacht on 16 October 1940, the Gewehr 33/40 had originally been introduced as the 'Krátká četnická puška vz.33' for the Czechoslovakian police and financial guards.<sup>4</sup> Production of the minuscule Gew.33/40 continued under German

4. Only about 25,000 'Krátká četnická puška vz.33 pro čs. četnictvo a finanční stráž' ('model 33 short rifle for gendarmerie and financial guards') had been acquired prior to the German invasion.



supervision; intended for the Gebirgsjäger, most guns display a reinforcing plate on the left side of the butt. A short-lived variant even had a folding stock. The standard 33/40 had a German-style nose cap, but a full-length handguard ran from the front of the back sight to the nose cap. Unlike the original Czech vz.33, the German version accepted the SG.84/98.

Chambering a 7.65mm rimless cartridge, the Belgian Mle 89, or Gewehr 261(b), could be distinguished by its projecting magazine casing and jacketed barrel. By the Second World War, however, most surviving pre-1918 Mle 89 rifles had been shortened to 'Mle 89/36' standards and their barrel jackets were removed – an expedient while supplies of the 7.65mm Kar.98k-type Mle 35 short rifle had been assured. Issue of the latter was not universal by 1940. However, few Belgian rifles were used by the Wehrmacht.

Poland provided indigenous Mauser

equipped the Imperial German rifle factory in Danzig. The standard service rifles were the Karabinek wz.98 and wz.29, the former being a near facsimile of the German Kar.98 AZ (but with a uniquely squared stacking rod and sling swivels) and the latter essentially similar to the Czech vz.24 short rifle. As the Karabinek chambered the German 7.9mm cartridge, the Wehrmacht easily assimilated large numbers of ex-Polish weapons. The Poles also had small numbers of wz.25 rifles (or 'wz.91/98/25'), which were shortened ex-Russian obr.1891g Mosin-Nagants, modified for the rimless 7.9mm cartridge. Unlike the original Russian rifles, however, they accepted standard knife bayonets.

### THE GEWEHR 98/40

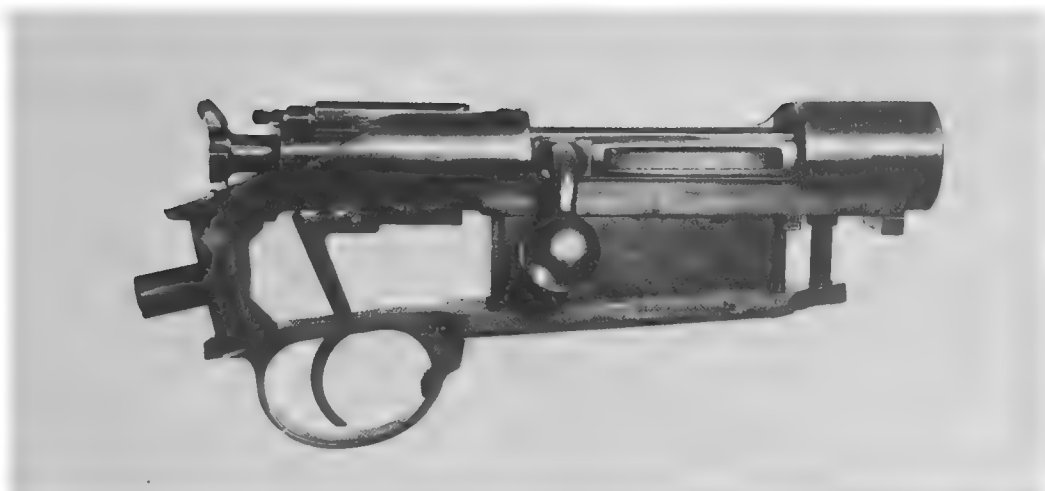
Unlike the Gewehre 29/40 and the 33/40,

35.M Mannlicher rifle, purchased from 'Metallwaren-, Waffen- und Maschinenfabrik' – the Hungarian state firearms factory in Budapest, code 'jhv'. Many thousands were delivered from 1941 until November 1944. The Gew.98/40 is easily distinguished from the 35.M by its German-style charger-loaded magazine, a 4cm bayonet bar, sights for the 7.9mm S-Patrone, a down-turned bolt handle, and a sling-slot in the butt. It also had a split-bridge receiver and a British-type stock with a separate fore-end. The butt was held in the action-body socket by a sturdy bolt running up through the pistol grip.

The result was a sturdy and reliable rifle, the only problem being that butts occasionally worked loose. Impressed, the Hungarians subsequently rechambered the German action for their standard 8mm 31.M cartridge, changed the fore-end to accept the Hungarian bayonet, and adopted the 98/40 as the Huzagol 48.M.

**141 TOP LEFT**

The Gew.29/40, used extensively by the Luftwaffe, was the post-1930 designation for the standard Austrian Modell 31 infantry rifle. It was such a close relation to the Kar.98k that, apart from re-chambering it for the standard 7.9mm cartridges and substituting a German-type bayonet bar, little was needed to suit it to German service. *By courtesy of Ian Hogg.*

**142 CENTRE LEFT**

The Gew.33/40, based on the Czech vz.16/33 short rifle, was popular with the Gebirgsjäger. This particular example – which displays its compact dimensions to good advantage – has an unusual hinged butt. *By courtesy of Ian Hogg.*

**143 BOTTOM LEFT**

Also known as the Gew.261(b), the Belgian Mle.89 Mauser had a protruding single-column box magazine and a prominently jacketed barrel. The first successful smallbore Mauser, it was obsolescent by 1939. *By courtesy of The Pattern Room, Enfield Lock.*

**144, 145 RIGHT**

The Gew.98/40 was based on the Hungarian 35M Mannlicher rather than the Kar.98k. Note the position of the bolt-handle, which turns down ahead of the receiver bridge instead of behind it. *LPI archives.*

**146 BELOW**

The open action of 1943-vintage Kar.98k, made by Gustloff-Werke. Note the dual-opposed locking lugs on the bolt head and the typically Mauser 'wing' safety on top of the cocking piece. *By courtesy of Ian Hogg.*

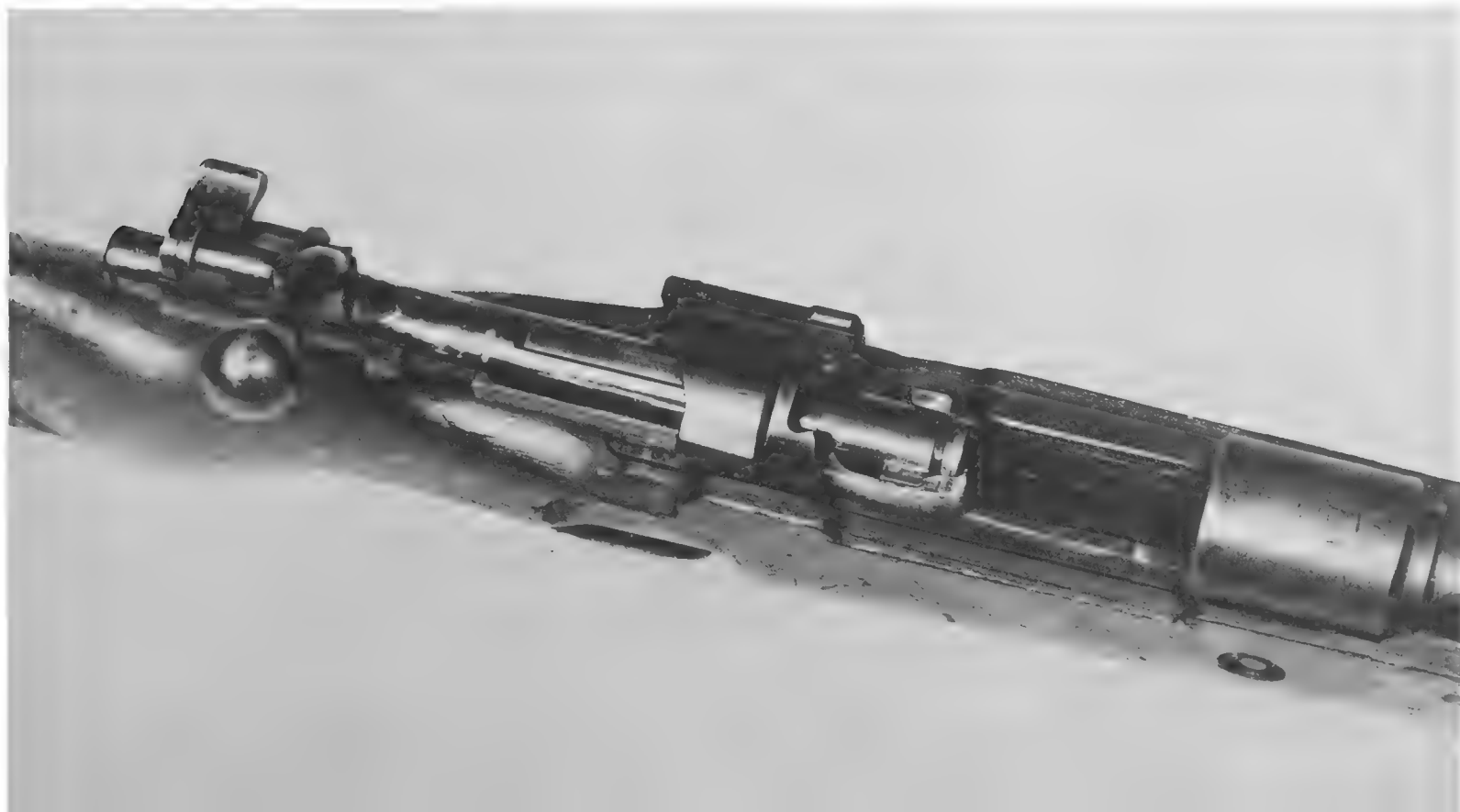
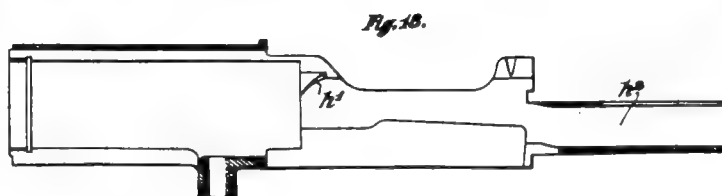
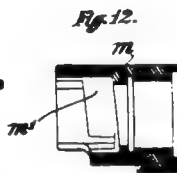
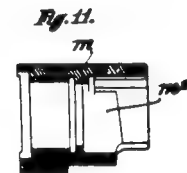
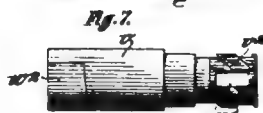
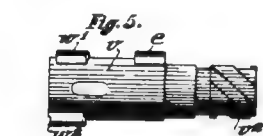
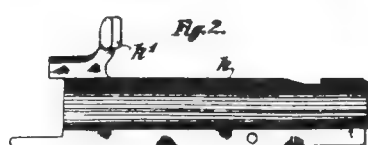
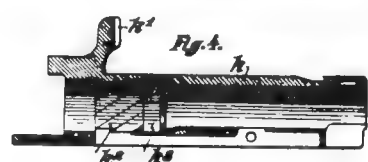
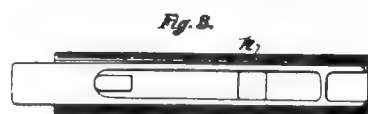
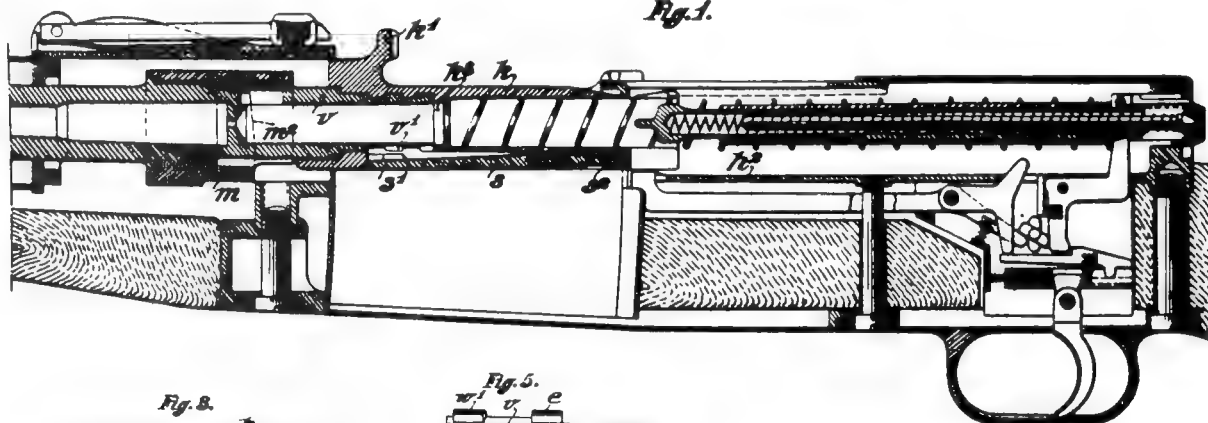


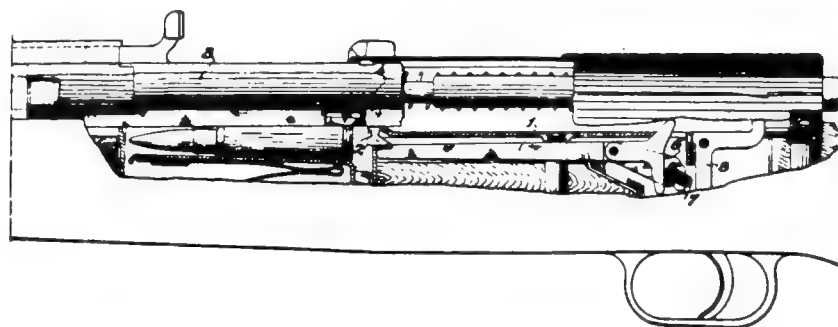


Fig. 1.



149

Mauser experimented with several semi-automatic rifles in the mid 1930s, these drawings being typical of the so-called M35. This gun was later developed into the Gew.41 (M), which shared the same kind of rotary bolt head but had a differing operating system. From the papers of DRP 651,363 and 712,086. By courtesy of the Deutsches Patenamt, München.







**147 LEFT 148 ABOVE LEFT**

The two principal self-loading rifles used by the Germans in the First World War were the Mexican-designed 7mm-calibre Mondragon, which was purchased in Switzerland, and the clumsier and more complicated 8mm Mauser (top). *By courtesy of Dr Rolf Gminder.*

## Automatic rifles

Fascinated by the idea of automaticity in a service rifle, and well aware of the technological implications of adopting a serviceable design, the Germans had tested many guns prior to 1914.

Mauser's vaunted reputation had often persuaded the GPK to issue his complicated, cumbersome and expensive recoil-operated rifles for trial – including the so-called C/98, C/98-02, C/06 and C/06-08 – but none had been successful. A clutch of Mannlichers had been submitted by Österreichische Waffenfabriks-Gesellschaft, together with toggle-action DWM guns designed by Luger and Borchardt, the Danish-designed Bang rifle and, presumably, others as yet unknown.

The only semi-automatic rifle to be officially approved during the First World War, however, was the Mexican-designed Swiss-made Flieger-Selbstladekarabiner 1915 ('FSK' or Mondragon). Adopted on 2 December 1915, the gas-operated Mondragon fired Belgian-made 7×57mm cartridges rather than the standard 8mm S-Patrone. About 3,000 guns were purchased from Schweizerische Industrie Gesellschaft, where they had been stored since the Mexican revolution of 1911. As the GPK considered the original small-capacity box magazine inappropriate for aerial combat, about 20,000 Trommel-magazine (drum or 'snail' magazines) were made by Hamburg-Amerikanischen Uhrenfabrik of Schramberg. The guns

were subsequently issued to the Fliegerkorps and the Kaiserliche Marine, but were withdrawn once effectual aircraft machine-guns became available. FSK subsequently appeared in the trenches, but disappeared again when their susceptibility to jamming became obvious.

Tiny quantities of the stupefying-expensive 8mm-calibre Mausers were procured in half- and full-stocked variants (designated Selbstladekarabiner and Selbstladegewehr respectively), each costing six times as much as a Mondragon. The fully-stocked Mausers had standard Gew.98 nose-caps, accepted the standard bayonets, and were intended for the army. However, experience in the air, at sea and in the field convinced the GPK that the simpler gas-operated Mondragon – though far from perfect – was preferable to the clumsy recoil-operated Mauser.

### THIRD REICH GUNS

Little of the research undertaken during the Weimar Republic had lasting results, only the Selbstladegewehre Rh.28 and Rh.29 being easily identifiable. Designed by Karl Heinemann for Rheinmetall, these have distinctive lateral toggle-locks on the right rear of the receiver, box magazines protruding from the left side of the

receiver, and Bang-type muzzle cups to trap and divert propelling gases onto the actuating rod. Mauser produced the experimental Selbstladegewehr M35 in the mid 1930s; Walther experimented with the forerunner of the MKb.42(W)<sup>5</sup>. Neither encountered immediate success.

By 1941, but apparently before the commencement of Operation 'Barbarossa', the HWaA had issued outline specifications for a semi-automatic rifle to Mauser, Walther and, presumably, other interested parties such as Krieghoff. Mauser and Walther soon responded, both rifles being hurried into limited production to facilitate field trials. It had been realized during the opening phases of the invasion that the Russians already had appreciable quantities of Tokarev self-loaders, which were more effectual than the Germans had expected.

The experimental 'Gewehre 41' both incorporated the muzzle-cup gas system and fixed ten-round box magazines that could be loaded from chargers or with loose rounds, features presumably specified by the HWaA. The Gewehr 41(M), made in Mauser-Werke's factory in Oberndorf ('byf'), had a distinctive receiver with a non-reciprocating bolt-type cocking handle on the right. Its Walther competitor, the Gewehr 41(W), made in Zella-Mehlis ('ac'), was cocked by retracting the breech cover. It has been estimated that 20,000 Gew.41(M) were made,

5. The dating of Walther's GA 115 project has been recently questioned. Instead of being the prototype of the Gew.41 or MKb.42(W), it is suggested that it post-dates both and should be considered as a 'simple rifle' project of 1943-4. The case is not proven.



150-152 ABOVE

but this seems optimistic; production of Gew.41(W) amounted to about 8,000.

Internally, the actions were similar in concept but markedly different in detail. Both guns trapped propelling gases in the muzzle chamber and then allowed it to push back on an operating rod as it expanded. The Mauser actuating rod lay beneath the barrel, while Walther's was above it. In addition, Mauser used a two piece 'straight-pull' bolt with a rotary bolt head, not unlike some of the Austrian Mannlicher rifles, while the Walther had a modified Friberg-Kjellman flap-lock. The guns were fully stocked, had tangent-leaf back sights and accepted the standard bayonet.

The Walther prototype proved the more successful, being adopted in December 1942 as the *Gewehr 41* (without suffix). The principal changes appear to be the elimination of the mechanical hold-open and – possibly after production had commenced – in the safety system, which was radically revised to

prevent damaging the internal components if the safety lever was rotated when the gun was cocked. Despite production by Carl Walther Waffenfabrik ('ac') and Berlin-Lübecker Maschinenfabrik ('duv'), the Gew.41 was speedily abandoned. The campaigns in Russia had exposed the susceptibility of the muzzle-cup system to corrosion. Though the Gew.41 breech-lock had functioned efficiently and the action was acceptably smooth, the rifle was noticeably muzzle-heavy and cumbersome. And the muzzle chamber was very difficult to clean.

The Russian SVT40 (Tokarev) rifle had been captured in large numbers, and first-hand experience soon showed its superiority. Though the initial contracts called for 70,000 Gew.41, there is no evidence that they were completed before being substituted by the *Gewehr 43* with effect from 30 April 1943. The Gew.43 amalgamated the Tokarev gas system, a detachable box magazine and the Walther breech-lock. Unfortunately, it

The first German semi-automatic rifles to be used in quantity during the Second World War were the Gew.41(M) (top) and Gew.41(W) (centre) – designed by Mauser and Walther respectively. As both incorporated an unnecessarily complicated gas-expansion chamber at the muzzle, neither was especially successful. The Walther had the better action; ordered into service as the Gew.41, it was then abandoned in favour of the simpler Gew.43 and Kar.43 (bottom). This amalgamated the Gew.41 breech-lock with the gas system of the Russian Tokarev. *By courtesy of The Pattern Room, Enfield Lock.*

was ordered into full-scale production before development was complete, and never entirely overcame a reputation for unreliability.

The Gew.43 was not unlike the Gew.41(W), particularly where the breech was concerned, but had a half-stock with a full-length handguard and a slender unsupported barrel. The gas-tube, piston and actuating-rod assembly lay above the barrel; when the gun was fired, a portion of the propelling gas bled back into a hollow piston chamber to tap



150



151



152

**154 BELOW**

The Walther-designed Gew.43 amalgamated the gas system of the Russian Tokarev with the flap-pattern breech-locking mechanism of the Gew.41 (inset). *Author's archives.*

**153 ABOVE**

Taken in the suburbs of Warsaw, Poland, on 5 October 1944, this photograph is notable for the fine array of MP.40 machine-pistols, a Kar.98k or two, and – over the nearest man's shoulder – the rarely encountered Gew.41(M). Two 'Goliath' tracked demolition vehicles are being readied for action. *LPI archives.*



the actuating rod back against the breech cover. As the cover retreated, it pulled the firing pin away from the breech and camed the locking arms back into the breechblock.

The Gew.43 butt displayed a typically-German sling slot, and a rail for the Zi.4 telescope sight was inevitably found on the left side of the receiver. Like the Gew.41, the Gew.43 chambered the standard 7.9mm S-Patrone rather than the intermediate Pist.Patr.43. A simplified variant, lacking the hold-open and cleaning rod (and often without the optical sight bracket, too) was apparently called the Karabiner 43 – though much the same size as the 'rifle'. Manufacturers

included Walther ('ac' and 'qve'), Berlin-Lubecker Maschinenfabrik ('duv') and Gustloff-Werke in Weimar ('bcd').<sup>6</sup>

Despite the attention paid to the MP.43 assault rifle in the immediate postwar period, and the greatly inflated reputation of the limited-production FG.42 (q.v.), the Gewehr 43 was considered as the true replacement for the Kar.98k. The HWaA still considered the 7.9mm S-Patrone as the only acceptable cartridge for universal military service, restricting the intermediate cartridge to theatres where a need for firepower outweighed limited range. Consequently, production of Gewehr 43 approached a half-million: 324,300 were delivered in 1944 alone. However, though potentially the best semi-automatic rifle design to reach active service during the Second World War, reliance on sub-contractors and imperfect metalworking techniques greatly hamstrung the production programme. Though the Gew.43 was generally well finished internally, external finish was often rough and the tolerances of non-essential components fluctuated enormously. Allied with material of suspect quality, particularly on guns made in 1945, these problems now obscure the rifle's genuinely outstanding qualities.

<sup>6</sup> The Kar.43 is sometimes claimed to have been 5cm shorter than the Gew.43, but measurements of surviving specimens show a near-identical overall length. The principal differences seem comparatively minor and it is by no means certain why a distinction should be drawn.

## THE PARATROOP RIFLE

During the early 1940s, the Luftwaffe approached the army with a request for special rifle to arm the paratroops. The specification asked for a selective-fire gun no more than a metre long, about as heavy as the standard infantry rifle and firing the full-power 7.9mm cartridge. The army speedily rejected the proposal as unattainable, so the Luftwaffe simply contacted Rheinmetall, Krieghoff, Mauser, Gustloff-Werke, Walther and other well-established arms makers independently.

Only Rheinmetall and Krieghoff responded, but the rising-block Krieghoff prototype was rejected in favour of the Stange-designed Rheinmetall gun. After development had been completed in the Rheinmetall-Borsig factory in Sömmerda, production of the Fallschirmjärgewehr 42 began, rather ironically, in the Krieghoff factory in Suhl ('fzs').

The original FG.42 features 'straight-line' construction, folding sights high

above the bore, a pressed-steel butt, a sharply-angled pistol grip to improve control, a short wooden fore-end/hand-guard, and a permanently attached bipod pivoted at the breech rather than the muzzle. A twenty-round box magazine fed laterally from the left side and a special reversible spike bayonet was housed beneath the barrel. The rifle was gas operated, relying on a long-stroke piston/bolt carrier to rotate the twin locking lugs on the bolt head. Among the oddest features was the method of selecting single-shots or fully automatic fire by two differing sear/bolt carrier engagement notches. The bolt closed and locked in semi-automatic mode, the firing pin (mounted on the bolt carrier) reaching the cartridge only after the trigger was pressed; in automatic fire, the bolt and the bolt carrier were both released together from the rearmost position. This gave an equally odd reloading procedure. Once the magazine had been emptied and removed, the bolt remained open only if the selector was set for fully automatic fire; pulling the trigger once the new magazine had been inserted caused the bolt to close, loading a new round, and the bolt carrier followed immediately to fire the gun. If single shots were being fired, however,



### 155 LEFT

The first-pattern FG.42 is tested by a Fallschirmjäger. Note the height of the sights – necessitated by the straight-line design – and the spike bayonet protruding beneath the muzzle. By courtesy of the Bundesarchiv; negative no. BA 567/1831/27a.

### 156 RIGHT

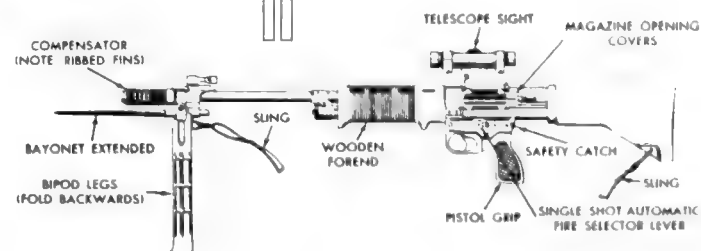
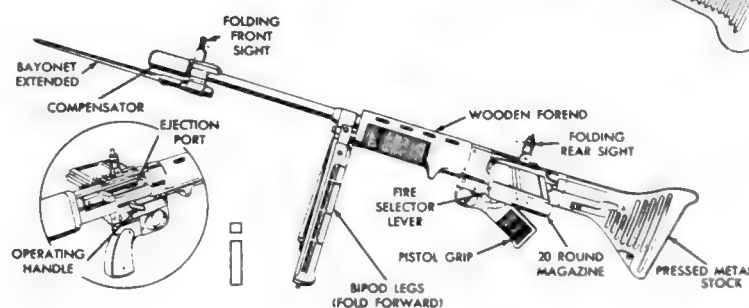
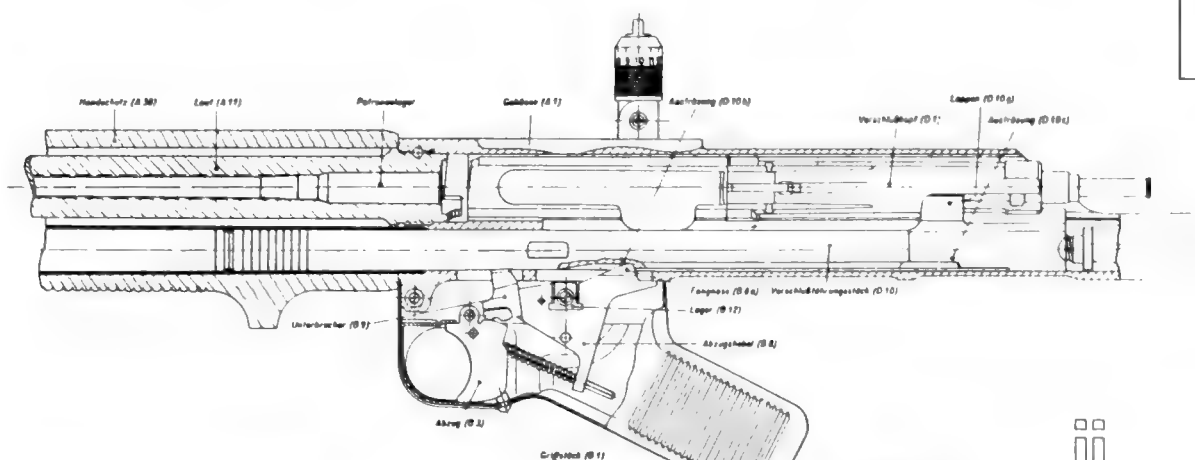
The Fallschirmjärgewehr, or FG.42, was a highly advanced combination of automatic rifle and light machine-gun. These drawings illustrate the overall appearance of the first-pattern gun (i, ii), together with sections of its action ready to fire from an open bolt (iii),<sup>\*</sup> running forward to reload (iv), beginning to extract (v) and ejecting the spent case (vi).

the bolt shut as the spent magazine was withdrawn and the action needed to be retracted manually before shooting could recommence.

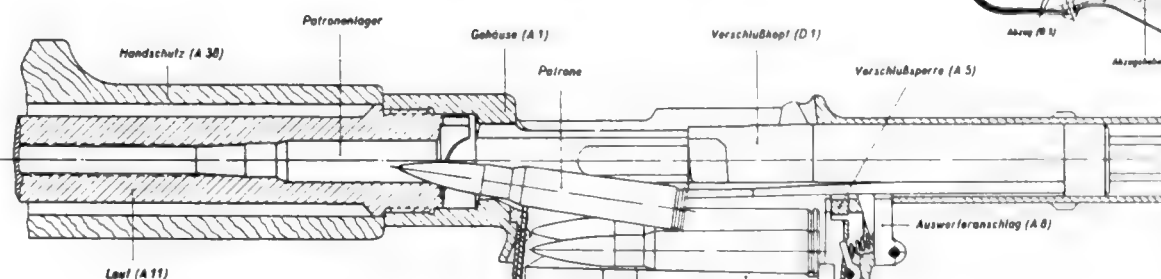
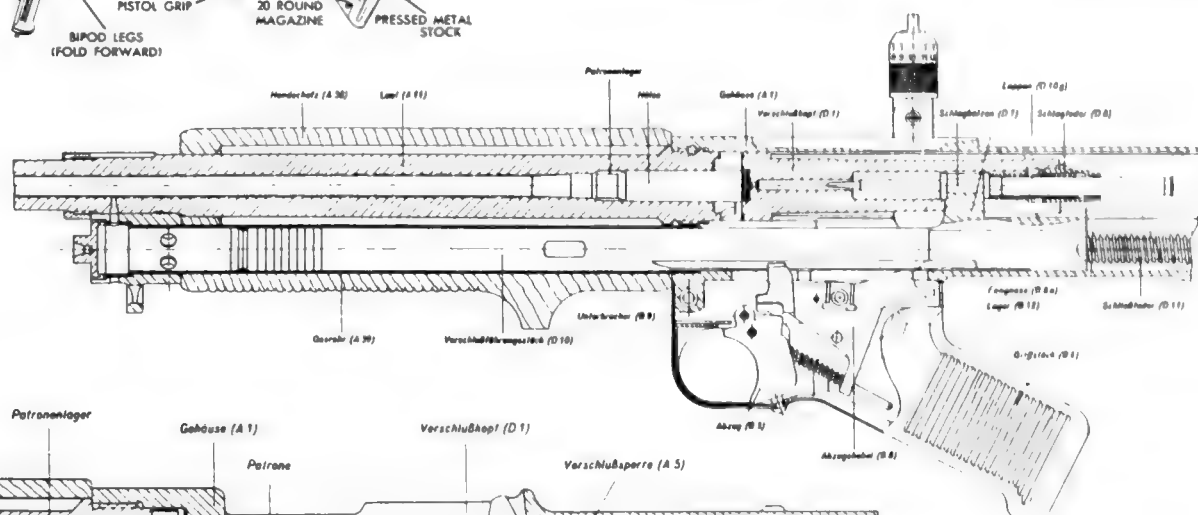
The FG.42 was completely redesigned to save manganese steel after less than two thousand guns had been made, carbon steel being substituted. So many parts needed strengthening that the opportunity to redesign the FG.42 in the



# FG42

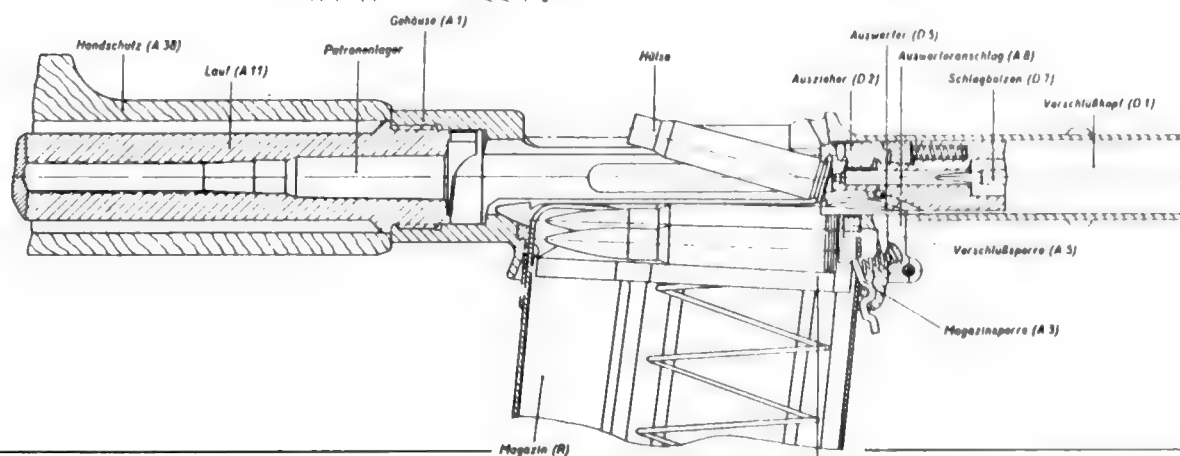


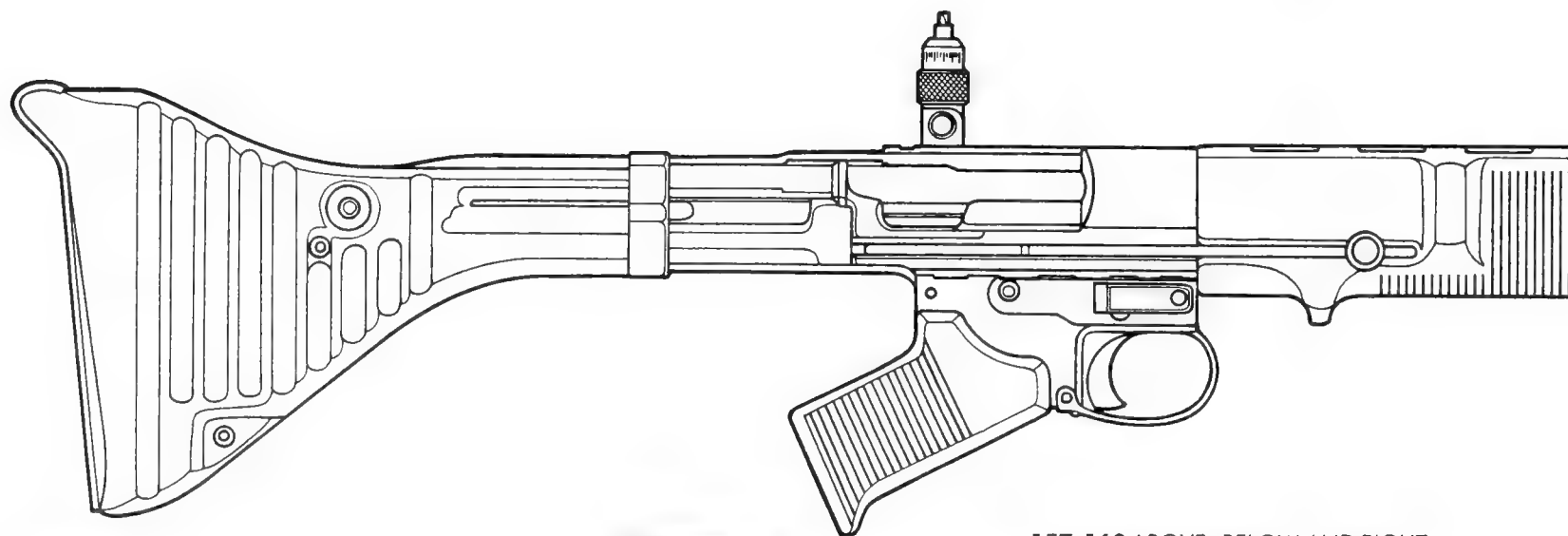
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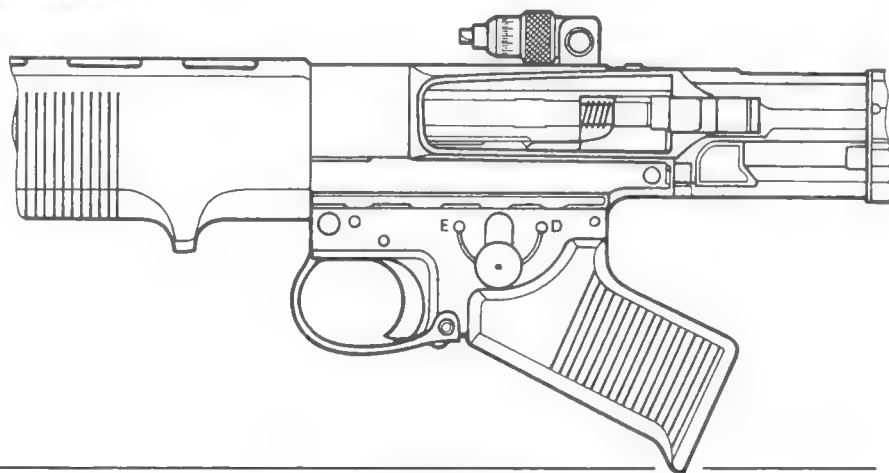




157-160 ABOVE, BELOW AND RIGHT



Two versions of the FG.42 or Paratroop Rifle were made. The earlier was characterized by compact design, a metal butt and an oddly angled pistol grip. When supplies of vital molybdenum steel were withheld, the gun was remodelled into a larger and more conventional-looking version with a wood butt. *By courtesy of the School of Infantry Museum (photograph by Ian Hogg) and The Pattern Room, Enfield Lock.*



light of combat experience had been unexpectedly presented. Changes included improving the muzzle brake; moving the bipod pivot to the muzzle, which enhanced stability; providing a variable-orifice gas regulator to cope with variations in ammunition pressure (or cumulative propellant fouling); packaging the trigger into a detachable unit; re-positioning the safety catch; fitting a wood butt and a more conventional plastic pistol-grip; adding a magazine cover and a spent case deflector. As the bolt stroke had been lengthened to reduce the violence of the breech movement, the FG.42 II was appreciably longer and larger

than its predecessor. Only the bayonet remained unchanged.

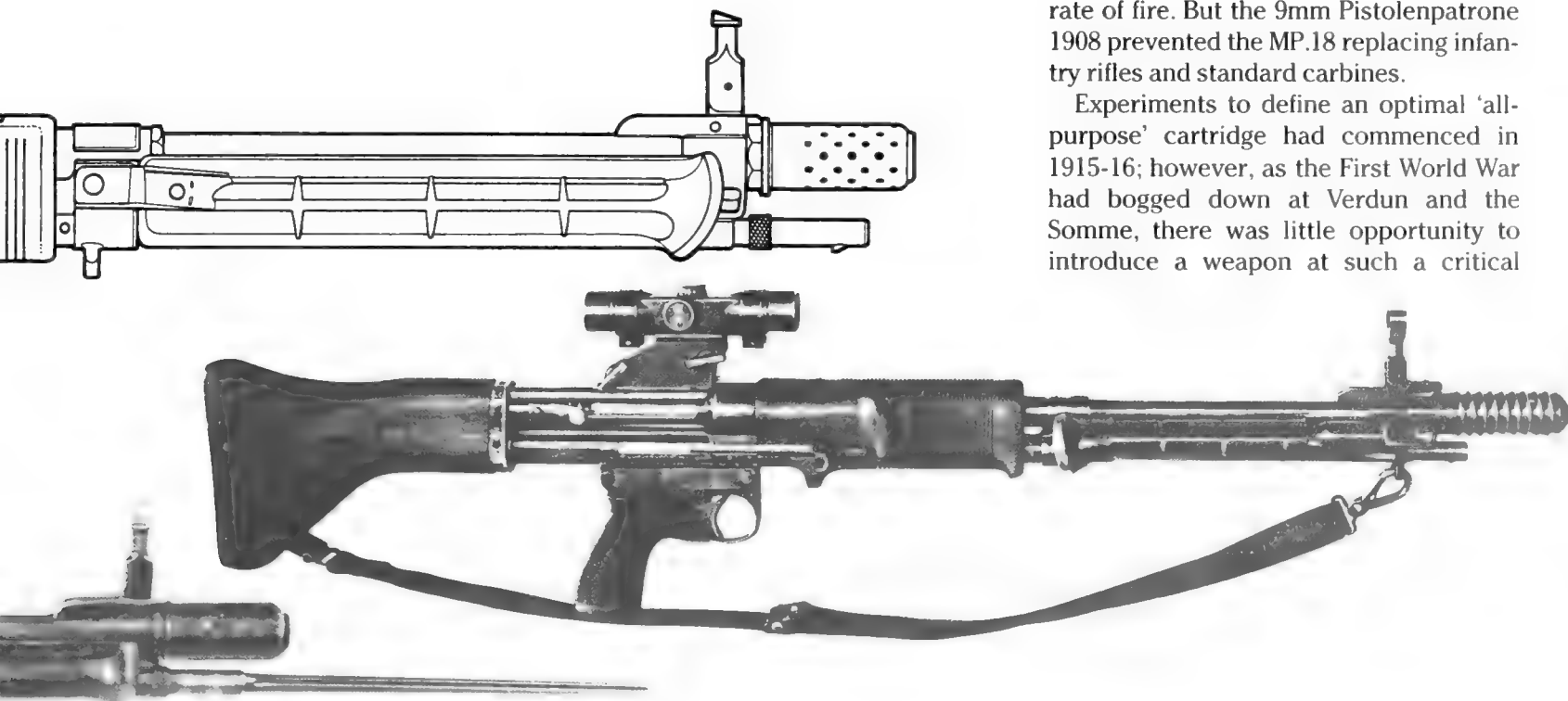
Only about 7,000 rifles were made, but they quickly attained a reputation entirely out of proportion to their numbers. Though the FG.42 had inherent faults – unstable in automatic fire, with a badly-placed magazine – it was an impressive attempt to provide a full-power assault weapon, and is rightly regarded among the masterpieces of pre-1945 automatic weapon design.

However, though some elements of the rifle are incorporated in the US M60 machine-gun, the FG.42 has not been as influential as the MG.42.

## THE FIRST ASSAULT RIFLES

The Germans had realized during the First World War that the standard 7.9mm rifle cartridge was too powerful and the 9mm Parabellum pistol cartridge not powerful enough for shoulder-fired weapons.

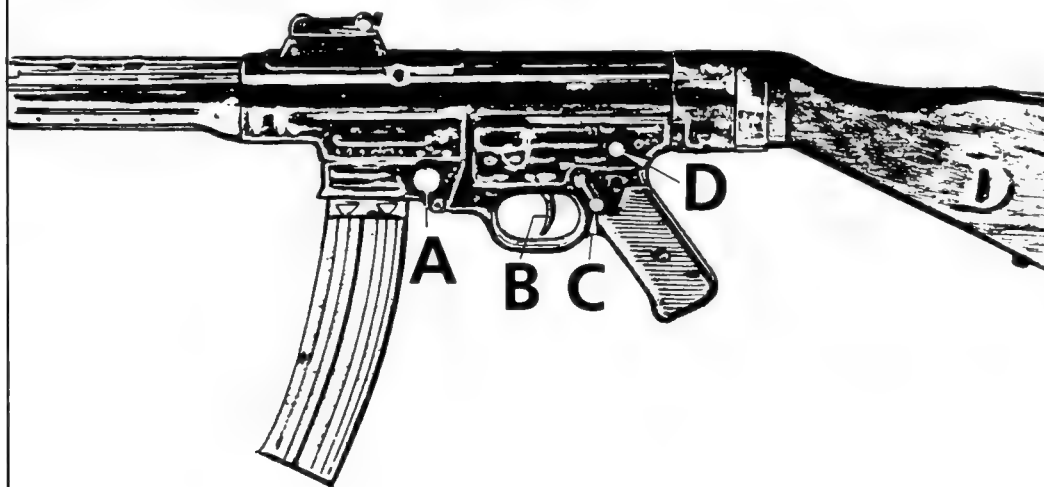
The Bergmann MP.18, I submachine-gun – despite its badly designed Trommelmagazin and excessive weight – promised great utility during close-quarter assaults, being handy, simple to use, easily maintained, and possessing a good



### How to fire the MP.43

Starting with the gun in its fired condition, with an empty magazine in place and nothing in the chamber:

- Press the magazine catch **A** to release the magazine, which may be substituted by a fresh one (or the empty one reloaded with the aid of a tool usually found in the butt-trap).
- Press the new magazine firmly upwards until it locks securely.
- Grasp the cocking handle **A**, pull it back to the limit of its travel (which cocks the hammer), then let it run forward to chamber the topmost round from the magazine. The dust cover over the ejection port on the right side will spring open automatically.
- If the gun will not be fired immediately, rotate the safety lever **C** to its uppermost (horizontal) position.
- Select single shots or automatic fire by pressing the crossbolt catch **D**, to the left for single shots or right for continuous fire.
- If the gun is to be fired immediately, ensure the safety lever **C** is rotated downward (until near-vertical), then press the trigger **B**.
- The gun will reload as long as cartridges remain in the magazine, and will fire automatically if the selector has been set accordingly.
- When the last round has been chambered, fired and ejected, the action closes on an empty magazine and the loading sequence may recommence.



rate of fire. But the 9mm Pistolenpatrone 1908 prevented the MP.18 replacing infantry rifles and standard carbines.

Experiments to define an optimal 'all-purpose' cartridge had commenced in 1915-16; however, as the First World War had bogged down at Verdun and the Somme, there was little opportunity to introduce a weapon at such a critical

moment. Whether the GPK would have progressed to hybrid cartridges after 1918 is an open question, as all experimentation was stopped by Treaty of Versailles.

Trials were taking place at this time in Switzerland, where small numbers of 7.65×27mm cartridges had been made by the Eidgenössische Munitionsfabrik, Thun, under the direction of Oberst Eduard Rubin. Rubin's death in 1920 then opened the way for Adolf Furrer. Best known for his complicated toggle-lock machine-carbines, Furrer developed a 'Pistolengewehr' chambering 7.65×35mm cartridges in 1921 and a 'Maschinengewehrpistole' followed in 1922.

The ballistics of the short-case 7.65mm cartridges did not impress the Swiss authorities strongly enough, and the Furrer-inspired IMG 25 subsequently chambered standard full-length Ordonnanzpatrone.

Experiments with the intermediate cartridges continued in Switzerland into the 1930s, when copies of the drawings apparently passed into German hands through the intermediacy of Waffenfabrik Solothurn. Wehrmacht experts accepted that no change in the 7.9mm service cartridge was likely prior to 1935, but nevertheless continued work on 'intermediate' patterns. Gradually, therefore, a

vague requirement arose for light automatic carbine developing appreciably greater power than a submachine-gun firing pistol ammunition.

In the early 1930s, Rheinisch-Westfälische Sprengstoff AG ('RWS') and Gustav Genschow & Co. AG ('Geco') began trials with intermediate cartridges, initially adapted from '8×46R' or '8.15×46R' sporting pattern developed in the 1890s by a gunsmith named Fröhn. The cartridge case, initially 45-46mm and then 40mm long, lost its rim and gained a jacketed spitzer bullet weighing about 4.9gm; the 57mm-long case of the standard 7.9mm round was loaded with bullets weighing about 12gm. The Heereswaffenamt, sufficiently impressed, awarded Geco a development contract.<sup>7</sup>

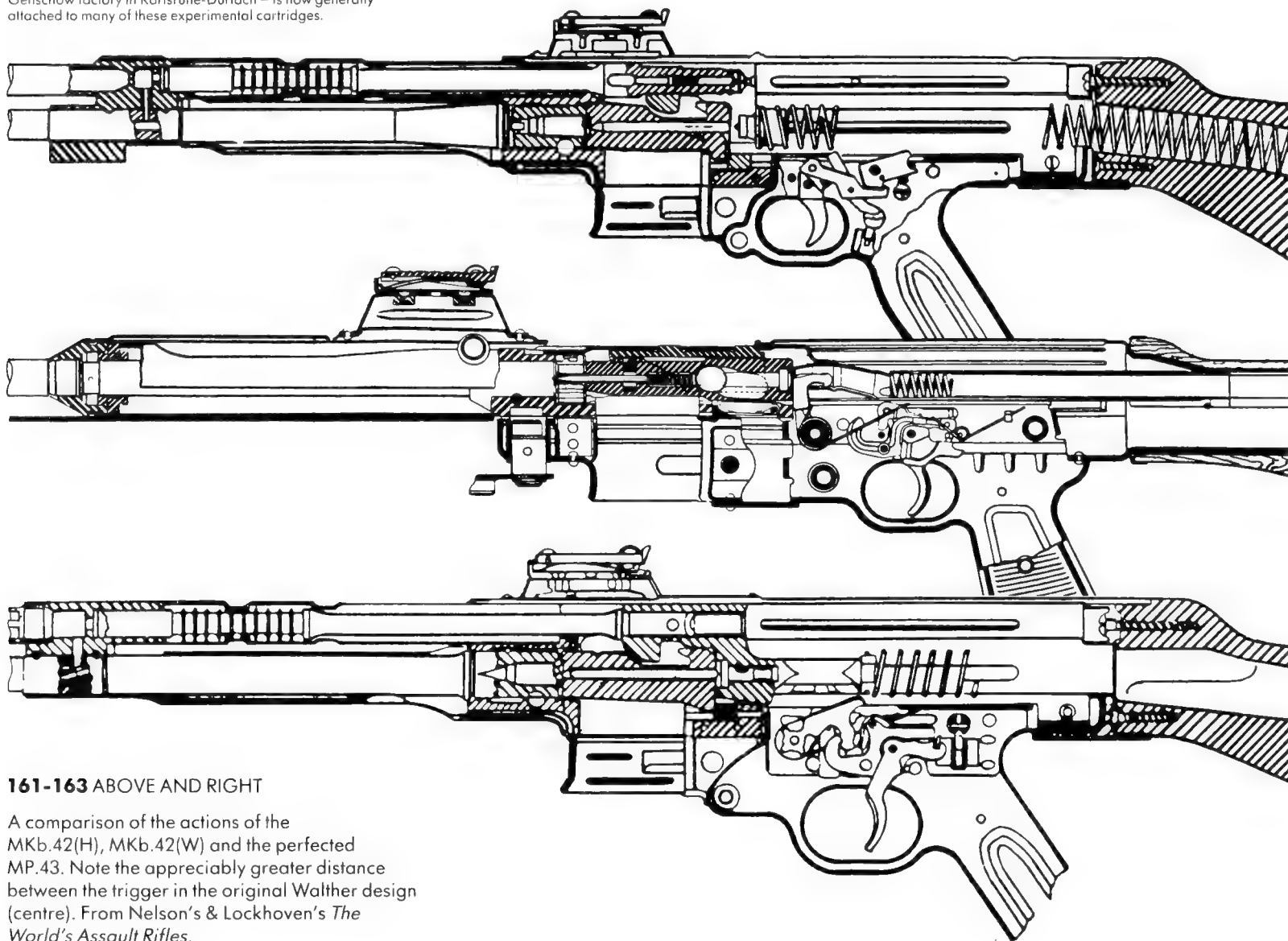
Genschow experimented with cartridges throughout the mid 1930s, their cases measuring 37-46mm and the bullets weighing 4.9-5.3gm. But no acceptable results had been obtained by 1937, owing to inconsistent HWaA directives and the absence of a definitive specification. From this period, only the Vollmer A 35/I (1935) and A 35/II (1938) have been conclusively identified; these carbines, about 960mm long and weighing 4.25kg, chambered a 7.75mm cartridge with a 40mm case from which a 9gm spitzer bullet could attain nearly 700m/sec.

Rheinmetall-Borsig's short-case round, designed by Fritz Herlach, crystallized as a 7mm bullet in a 36.5mm bottleneck case; the competing BKIW/DWM version,

developed by research facilities in Lübeck-Schlutup, initially had a 39mm case. Neither was adjudged wholly successful, though the latter could develop muzzle velocities in excess of 960m/sec. DWM was still doggedly championing its 7mm cartridge as late as 1942, when the base diameter had been reduced to that of the standard 7.9mm pattern – enabling conventional belts to be retained.

Failure of the short-case cartridges was largely due to worries about power. The HWaA then recruited Polte-Werke of Magdeburg and progress was made, even though the first Polte cartridge had a minuscule 30mm case loaded with a bullet weighing a mere 3.7gm. Only high velocity made this combination more effectual than the 9mm Pist.Patr.08.

7. The name 'Winter' – after Hans-Georg Winter, director of the Genschow factory in Karlsruhe-Durlach – is now generally attached to many of these experimental cartridges.



161-163 ABOVE AND RIGHT

A comparison of the actions of the MKb.42(H), MKb.42(W) and the perfected MP.43. Note the appreciably greater distance between the trigger in the original Walther design (centre). From Nelson's & Lockhoven's *The World's Assault Rifles*.





#### 164, 165 ABOVE

The successful prototype intermediate 'machine-carbine' was the Haenel-promoted MKb.42(H) (top), which overcame its Walther MKb.42(W) rival. However, the production version – the MP.43 – actually incorporated Walther's firing system in an otherwise Haenel-type layout. *By courtesy of The Pattern Room, Enfield Lock.*

By April 1938, the research and development bureau of the Heereswaffenamt, Wa-Prüf 2, had placed a contract with C.G. Haenel Waffenfabrik AG of Suhl to develop a selective-fire carbine for Polte's newest intermediate cartridge. The new firearm was termed 'Maschinenkarabiner' (MKb) to distinguish it from the 'Maschinenpistolen' (MP), and was expected to replace infantry rifles, sub-machine-guns and possibly even the light machine-guns.

The Haenel carbine was designed largely by Hugo Schmeisser, who had been responsible for the MP.18, during the First World War. The basic work had been completed by 1940, by which time Polte had perfected a cartridge.

However, as Haenel had little experience of simplified manufacturing techniques, transforming the Haenel prototype into a mass-production reality was entrusted to Merz-Werke GmbH of Frankfurt am Main, a company with unrivalled experience with metal stamping, precision casting and spot-welding. By this time, the German authorities, for once realizing that speed was vital, had formed a special sub-committee to supervise production of the new machine-carbines alongside the existing submachine-guns.<sup>8</sup>

While Haenel was producing the MKb.42(H) prototypes, a design-team led by Erich Walther had also begun work. Evidently believing that a better gun could be produced, Walther had completed an experimental gas-operated machine-carbine by the beginning of 1941. It was satisfactorily demonstrated to Wa-Prüf 2 and a contract for two hundred pre-production guns was let with Walther late in January 1942. Unfortunately, only two guns had been supplied July 1942, when extensive trials should have been undertaken at Schiessplatz

Kummersdorf. Walther's traditions of quality pistol production were unquestioned, but the company had even less experience of stamped-metal production techniques than Haenel.

It seemed as though both carbines would be ordered into production: Haenel was to begin work in November 1942, while Walther was to make five hundred guns in October 1942 and progress to 15,000 per month by March 1943. By July 1942, it was confidently assumed that production drawings would be complete, and that production machinery would be available.

The HWaA then added bayonet lugs and grenade launchers to the Maschinenkarabiner specification as an afterthought, severely disrupting progress, while unforeseen manufacturing difficulties – and sub-contractors' failure to reach targets – slowed progress to a crawl. A hundred guns was to be delivered in October 1942, but none

8. The Sonderausschuss für Maschinenpistolen und Maschinenkarabiner (Sd. Au. MP u. MKb), formed in 1941, was attached to the Hauptausschuss Waffen; the Ha.W, in its turn, answered to the Reichsministerium für Rüstungs- und Kriegsproduktion.

appeared; then only 25 of the November quota of 500 were forthcoming, followed by 91 of December's thousand.

The most serious problems had been resolved by the beginning of 1943, and so the delivery of 500 guns in January represented a shortfall of only 200; in February, Walther and Haenel actually exceeded the thousand-gun quota by 217.

The MKb.42(H) and MKb.42(W) were superficially similar, owing to the rigidity of the HWaA specification and extensive use of stamping, pressing and welding. Haenel's had its gas-tube above the barrel, extending forward almost to the muzzle, while the MKb.42(W) had a more pronounced straightline design with the

back sight on a tall block. The annular gas piston/barrel construction of the Walther carbine permitted a cylindrical fore-end casing from which only the barrel protruded. Like the perfected MkB.42(H), the Walther would also accept the SG.84/98. Both guns also featured a curved 30-round box magazine ahead of the trigger/pistol-grip group.

Internally, the Haenel carbine fired from an open breech and relied on a tilting block to lock the breech; the Walther, which fired from a closed breech, incorporated a rotary bolt. The MKb.42(H) measured 940mm overall, had a 365mm barrel, and weighed 5.02kg unladen; comparative figures for the

MKb.42(W) were 933mm, 409mm and 4.42kg respectively. Each had a cyclic rate of 550-600rpm.

Though the Walther was lighter, better balanced and more accurate, there was no doubt that Haenel's was simpler. The MKb.42(H) was ultimately standardized, but not before an adaptation of Walther's effectual hammer-fired trigger system had replaced the original striker pattern. The finalized MP.43, like the MKb.42(W), fired from a closed breech. Approximately 8,000 carbines had been delivered by the middle of 1943 – apparently, 2,800 Walthers and 5,200 Haenels – and annual production is believed to have totalled 14,000.



## THE PERFECTED ASSAULT RIFLES

The MP.43 was the refined Haenel Maschinenkarabiner, the term 'Maschinenpistole' being adopted to camouflage the assault rifle as a submachine-gun, and so overcome Hitler's aversion to it. It greatly resembled the MkB.42, but lacked the distinctively extended gas-tube; instead, a ball-tipped rod projected from the gas-port assembly.

Among the known variants are the MP.43/1, with the muzzle threaded for the MKb.Gewehrgranatgerät (later known as the MP.GwGrGt.43), whereas the MP.43, MP.44 and StG.44 had a shorter threaded

muzzle for the Kar.98k-type launcher. The MP.44 appears to have been nothing more than the original MP.43 renamed! Most MP.43/1 and some MP.44 guns have been seen with side-rails to accept the Zi.4 optical sight or the Zielgerät 1229 'Vampir' (ZG.1229) night sight. One or two have experimental muzzle brakes, or repositioned sights; and there are also a number of 'Krummlauf' (curved barrel) adaptations, including the 30-degree 'Vorsatz J', the 40-degree 'Vorsatz J' and the 90-degree 'Vorsatz P'.

Production was entrusted largely to

C.G. Haenel Waffen- und Fahrradfabrik ('fxo') of Suhl and Erfurter Maschinenfabrik B. Geipel GmbH 'Erma-Werk' ('ayf') of Erfurt, while Mauser-Werke AG ('byf') of Oberndorf and an unidentified company using the code 'sup' made receivers. However, many lesser contractors became involved in the MP.43 production line, including Merz-Werke Gebr. Merz ('cos') of Frankfurt am Main, Württembergische Metallwarenfabrik ('awt') of Geislingen-Steige, J.G. Anschütz Germaniawaffen-Fabrik of Zella-Mehlis, Progress-Werk, Lux, J.P. Sauer & Sohn

('ce') of Suhl, Erste Nordböhmsche Waffenfabrik Adolf Rossler ('fnh') of Niederinseidel, L.W. Zeug- und Metallwarenfabrik and, allegedly, Trippel-Werke Hanns Trippel of Molsheim/Elsass. Trippel's code, 'glu', has probably been mistaken for 'qlv'.

It is widely believed that Maschinenkarabiner enabled Kampfgruppe Scherer to fight its way out of the Kholm Pocket on the Eastern Front in the early days of 1942. The story originally appeared in 'Das Sturmgewehre' in *Wehrkunde* early in 1953, and was then repeated in Eckardt & Morawietz's *Die Handwaffen des brandenburgisch-preussisch-deutschen Heeres 1640-1945* (Verlag Helmut Ger-

hard Schulz, Hamburg, 1957). As 'Eckardt-Morawietz' is regarded as the bible of German researchers, the Kholm claim has been repeated by virtually every succeeding author without question.

However, the defenders of the Kholm Pocket broke out of encirclement in February 1942. No MKb.42(W) had then been delivered; and though at least a few Haenels had reached the HWaA, it is most unlikely that such valuable test-pieces would be dropped into an obscure part of Russia. The guns concerned are much more likely to have been Gew.41(M) or Gew.41(W), as sufficient pre-production examples were available by the end of 1941.

The first full combat trials of the new Maschinenkarabiner were apparently undertaken in the spring of 1943 by SS Division 'Wiking', more than half the firers reporting that the new gun was an effectual replacement for the standard submachine-guns and infantry rifles. The combination of firepower and controllability so impressed the elite troops that three army commanders reputedly asked Hitler's permission for the MP.43 – which he had believed to be cancelled – to enter immediate mass production. After seeking the troops' opinions personally, Hitler reversed his low opinion of the Maschinenkarabiner concept at the expense of the FG.42 and Gew.43. The MP.43

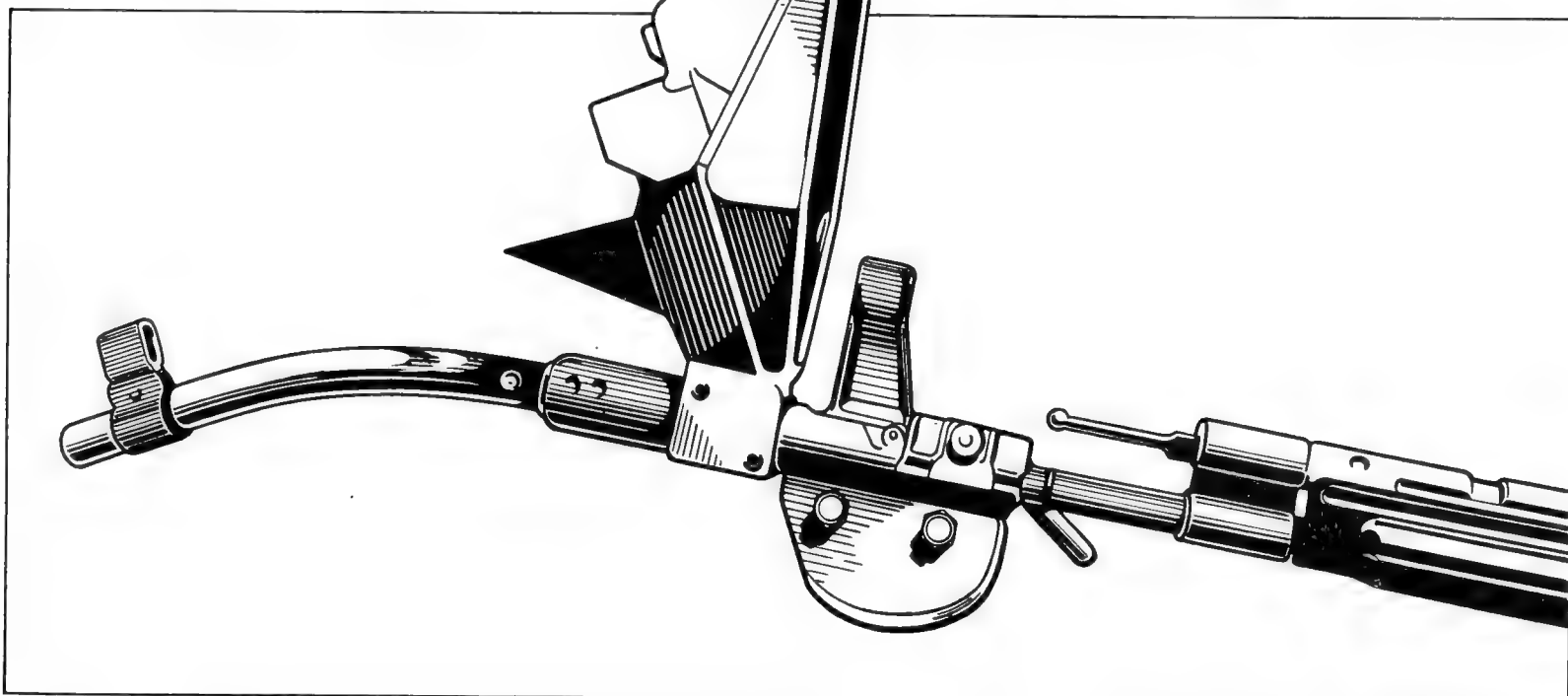


A comparison between the MP.43 (top) and the MP.43/I (bottom). Only the muzzle fixtures differentiate them. *Author's archives.*

**166, 167** LEFT AND BELOW

#### **168** BELOW

The 'Krummlauf' or curved-barrel adaptor was developed for armoured-vehicle use, in conjunction with the ball-and-socket mount shown here. It was eventually adapted for infantry use ... to fire round corners without exposing the firer.



was ultimately renamed Sturmgewehr 44 ('StG.44') in recognition of its capabilities.

The MP.43/StG.44 was one of the first military weapons to be mass-produced on the sub-contract system that later became commonplace. Like all pioneering efforts, however, this did not proceed smoothly; parts made by outworkers were not always satisfactory and too much handwork was needed to ensure the guns worked. Deliveries were erratic: only about 14,000 guns reached the Wehrmacht during 1943.

The new assault rifles, though exciting great postwar interest, never became available in the quantities that could have influenced the fighting. Production continued into 1945; however, as the MP.43 had always been made largely from stampings, it did not suffer the visible deterioration that characterized the Kar.98k or the Gew.43. Only the last batches were bonderized<sup>9</sup> rather than thinly blued, had laminated rather than solid wood butts, and wooden grips substituted by cheap plastic mouldings.

9. A phosphating process essentially similar to Anglo-American 'parkerizing'.

## STURMGEWEHRE PROTOTYPES

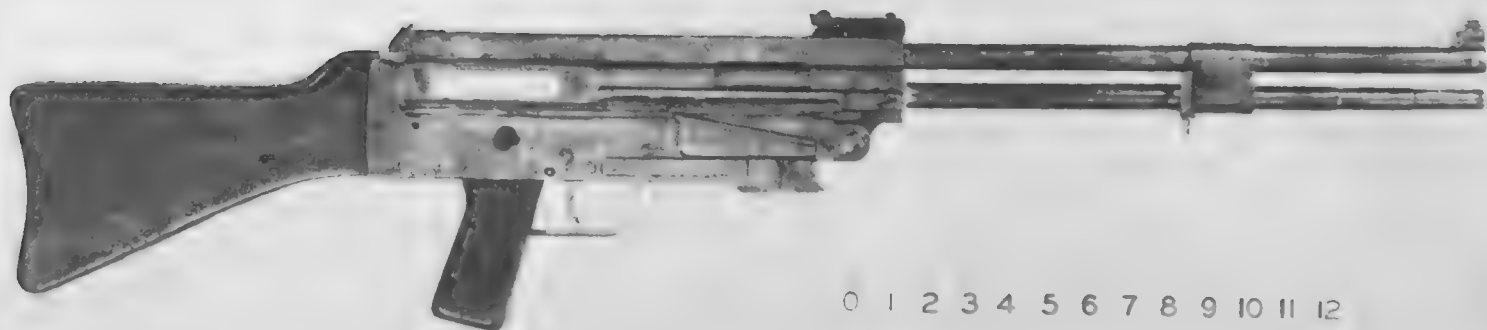
In spite of the success of the MP.43 series, or perhaps because of it, many other companies commenced work on assault rifles as early as 1942. Among them was Mauser, whose Gerät 06 featured a gas-operated roller-locked breech system generally credited to Wilhelm Stähle. The project was subsequently developed by a research team lead by Ernst Altenburger and Ludwig Vorgrimler, whose names are most often associated with it.

Identifying the Mauser prototypes is hindered by confusion in surviving documents. There were two basic designs: a gas-operated locked breech gun intended for the HWaA, and a delayed blowback developed privately. The locked-breech guns were apparently allotted development codes V.5823 (first prototype) and V.5911 (for an improved gun with a 'new shape' receiver), while the blowback was M.7066. These suggest dates of early 1943 and the middle of 1944 respectively. Should this be true, then the designation

'StG.45(M)' applies to Gerät 06 rather than Gerät 06(H).

Gerät 06, apparently V.5823, vaguely resembled the old Walther-made MkB.42(W), with a straightline layout and the back sight carried on a high block. However, the detachable box magazine was much closer to the trigger/pistol grip group and a cranked cocking aperture lay on the left side of the breech. The gun had a light sheet-metal barrel casing, a distinctive muzzle-brake/compensator and an MP.43-type butt. The Gerät 06 No.2 (V.5911?) was essentially similar, but once had a simpler butt and lacked the muzzle brake. The surviving gun has a plain flat-sided sheet-metal barrel jacket.

The third gun, Gerät 06(H), probably M.7066, had a modified breech in which the rollers simply delayed the opening stroke. This permitted the gas system to be deleted altogether. Owing to the similarity between Geräte 06 and 06(H), it is assumed that development was concurrent. The HWaA is known to have been suspicious of the delayed blowback design, though Mauser apparently favoured it on the grounds of simplicity.



0 1 2 3 4 5 6 7 8 9 10 11 12

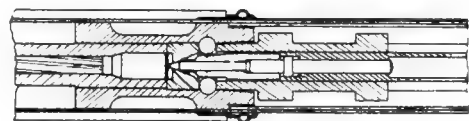
The guns all chamber the 7.9mm Pist.Patr.43 or 'Kurz-Patrone'.

Guns other than Mausers were tested by the HWaA, but few are identifiable. In December 1944, for example, the Gerät 06 was to be tested against Rheinmetall-Borsig and Grossfuss designs (expected to be delivered in January 1945) and possibly also a Haenel. Nothing is known about the Rheinmetall gun, though Grossfuss's had a gas-retarded wedge-lock. The so-called Haenel StG.45 (H) was a greatly simplified MP.43, somewhat resembling the MkB.42(H), but remained incomplete by the end of the war. An additional Gustloff-Werke prototype, credited to Barnitzke, relied on gas impinging on a muzzle cup to delay the MP.43 breech-stroke, despite the removal of the locking lugs, while Spreewerke and Steyr-Daimler-Puch are also said to have participated in the design competition.

A requirement for an assault rifle chambering the full-power 7.9mm rifle round caused Mauser to begin work on several projects – apparently Geräte 02, 03 and 07 – while a Gustloff prototype known as the MKb.42(G) 'für Gewehrpatrone' later developed into the Gew.43(G). The Gustloff gun, based on the old MG.13 light machine-gun, featured a tipping bolt and a 25-round box magazine. A very distinctive prototype made by Knorr-Bremse also survived the war, together with at least one other unidentifiable weapon. Whether these are contemporary with the FG.42, MKb.42, or even the Gew.43, is not yet known.

#### 169 RIGHT

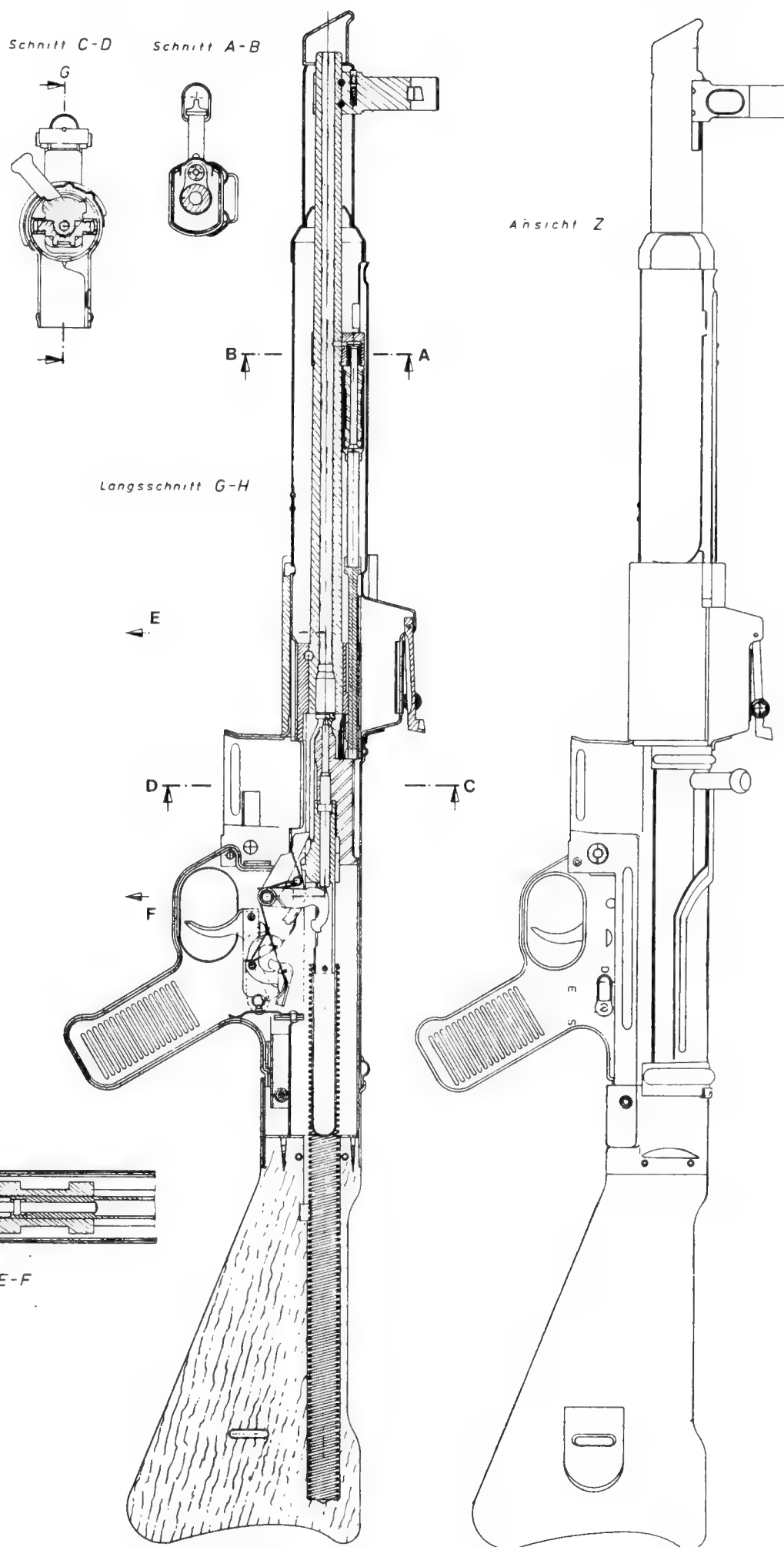
The Gerät 06, or StG.45, from a 1944-vintage Mauser drawing.



Schnitt E-F

#### 170, 171 LEFT

Competitors in the experiments to find a replacement for the MP.43/StG.44 series included the Mauser Gerät 06H (top), which competed against official indifference: the HWaA preferred the locked-breech Gerät 06 to the delayed blowback version. The StG.45(H) was a greatly simplified Haenel, based on the MKb.42(H). Only a single unfinished prototype (bottom) appears to have been made.







*By courtesy of The Pattern Room, Enfield Lock.*



## THE VG 1-5

The most interesting Volksgewehre was the Versuchs-Gerät 1-5 (sometimes called 'Volksgewehr 1-5' or VG.1-5), produced by Gustloff-Werke in 1945 to the design of Barnitzke. Though the rifle was very crudely made, with a sheet-steel barrel casing, a folded-strip back sight and badly-finished woodwork riveted to the frame, it embodied a sophisticated retarded blowback action relying on gas bled from the barrel into the annular gap between the barrel and its outer casing. This opposed the breech stroke until chamber pressure declined to a safe level.

These Volksgewehre were rarely officially sanctioned: their development was generally kept secret from Hitler, who disapproved greatly of such crudity.

Indeed, the VG.1-5 was apparently developed solely on the initiative of the Gauleiter of the Thüringen district – which was particularly vulnerable to the Russians. Most surviving examples lack Waffenamt marks, but have identifiers such as 'Th.1839' stamped into the butt.

## CAPTURED SELF-LOADERS

Few armies had adopted semi-automatic infantry rifles prior to 1939; though virtually all had attempted to develop them, only the US Garand and the Russian Simonov/Tokarev series had reached service status.

Vast quantities of Russian war matériel fell into Wehrmacht hands immediately Operation 'Barbarossa' began, and substantial quantities of semi-automatic rifles were immediately reissued to Ger-

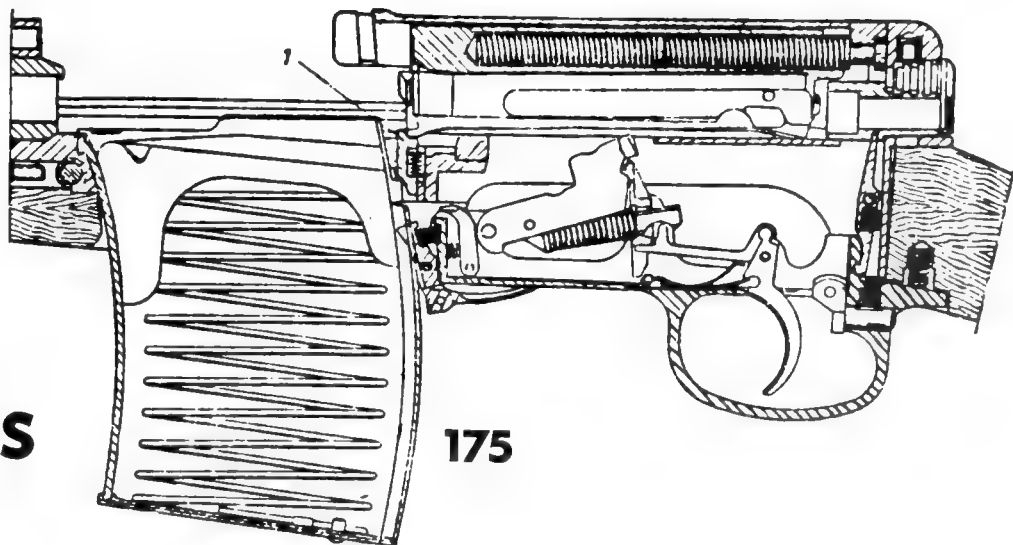
man troops. Simonov-designed AVS rifles, adopted in 1937 but made only in small numbers, were comparatively rare; the Tokarev SVT, however, was not only much more common but also to have an important effect on German rifle design.

Both Russian guns were gas operated, though the AVS breech-lock relied on a dropping hollow block rather than the simpler Tokarev tilting breechblock. The lightweight selective-fire AVS quickly proved too flimsy to withstand prolonged automatic fire; its replacement, the SVT 38, also proved to be too weak for the rigours of active service, and was almost immediately replaced by the SVT 40 (or Selbstladegewehr 259[r]). More than a million were made in 1940-3.

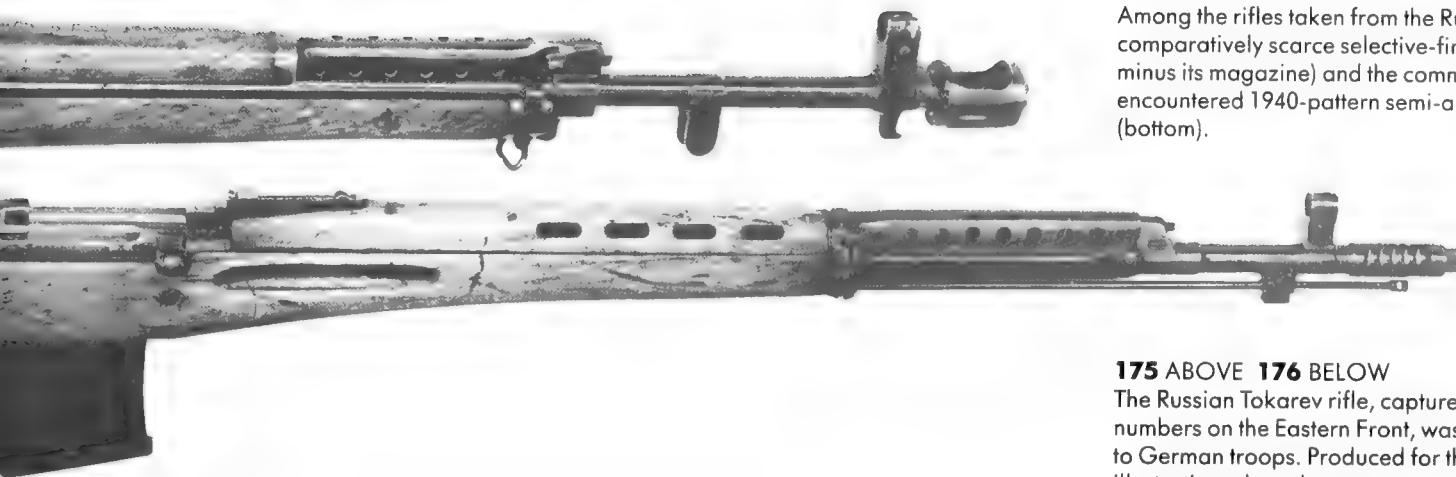
Though the Tokarevs are outwardly similar, the earlier gun has an entirely wooden fore-end and a full-length cleaning rod inset in the right side of the stock. The SVT 40 has a pressed-metal fore-end

**172 LEFT**

The Versuchs-Gerät 1-5 (or 'Volkssturmgewehr') was an interesting gas-impingement type of delayed blowback, developed by Barnitzke of Suhl and made in small numbers for the local defence of Thüringen at a time when manufacturing standards were declining irreversibly. *By courtesy of Ian Hogg.*



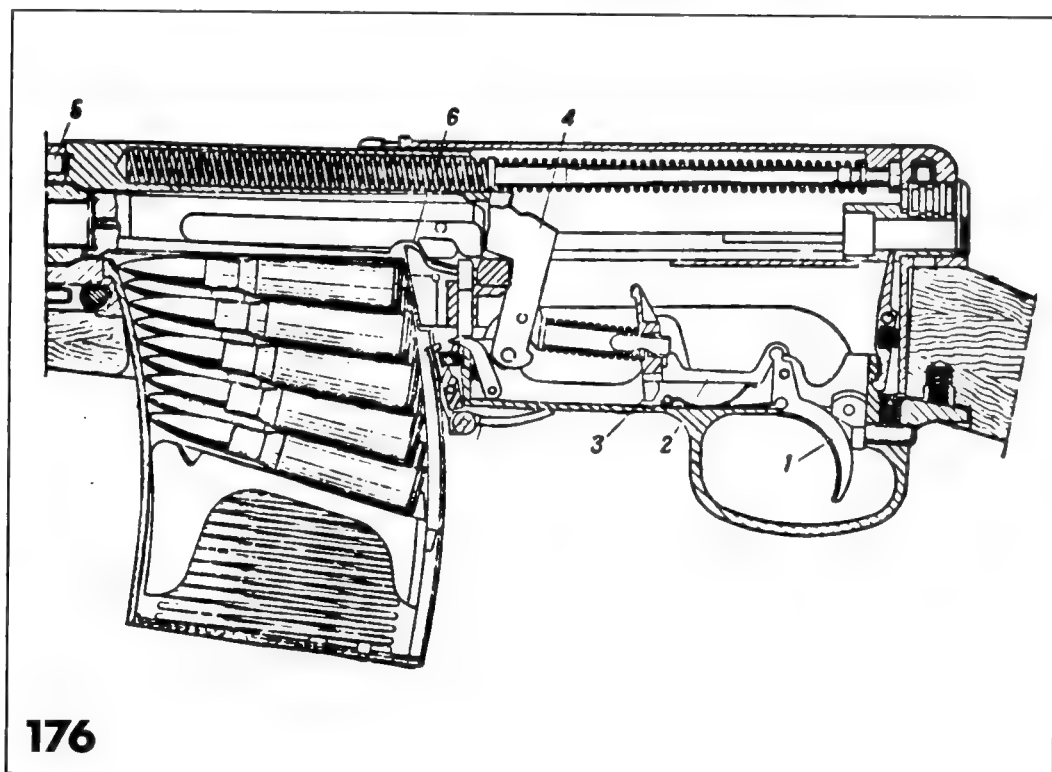
## Captured guns

**173, 174 LEFT AND BELOW**

Among the rifles taken from the Russians were the comparatively scarce selective-fire AVS (top, minus its magazine) and the commonly encountered 1940-pattern semi-automatic SVT (bottom).

**175 ABOVE 176 BELOW**

The Russian Tokarev rifle, captured in large numbers on the Eastern Front, was widely issued to German troops. Produced for the US Army, the illustrations show the gas system and breech-lock in detail. *Author's archives.*

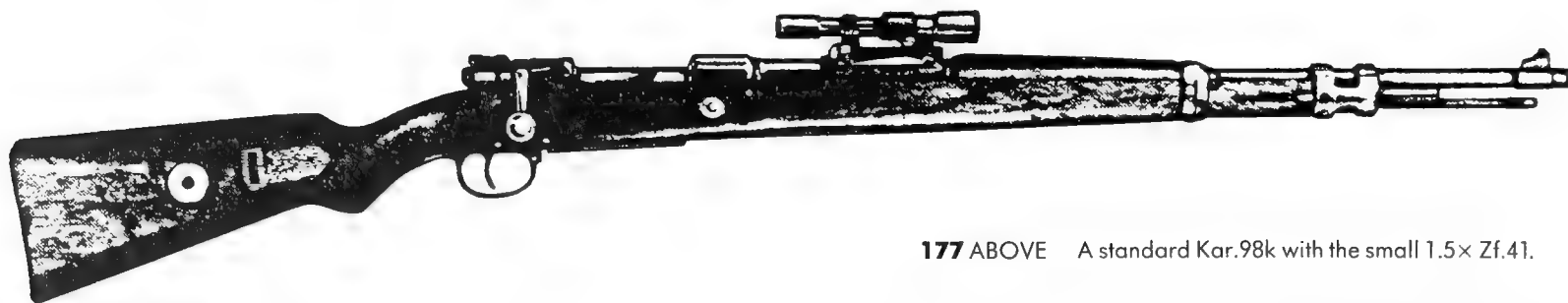


and a half-length cleaning rod beneath the barrel.

Tokarevs fired the powerful-but-clumsy 7.62mm rimmed Russian cartridge, which was far from ideal in automatic weapons and contributed greatly to jamming. However, the basic design was excellent; despite the low standards of construction – and occasional problems with the material – the rifle was well liked by the Germans, as its detachable box magazine was preferable to the internal boxes of the Gew.41. In addition, the Russian gas system was far easier to maintain than the cumbersome Gew.41 muzzle-chamber type.

Eventually, the Germans simply combined the Gew.41 breech with the SVT gas mechanism and produced the effectual Gew.43 (q.v.).

Excepting the Tokarev, the Germans impressed few semi-automatic rifles prior



**177 ABOVE** A standard Kar.98k with the small 1.5x Zf.41.

to the Allied invasions of North Africa, Italy and Europe, when small numbers of M1 Garands and M1 Carbines (or 'Selbstladekarabiner 655[a]') were captured. A few semi-experimental rifles were seized after the invasion of Czechoslovakia, but none of these had attained anything other than limited export sales. The most commonly reported were the Holek-designed ČZ-made ZH 29, which

had been made in appreciable quantity, and a handful of ČZ vz.S (c.1929) and vz.35 guns. As even the strangest weapons were pressed into service in the last desperate days of the war, it is not surprising that Czech semi-automatics – particularly those chambering standard 7.9 cartridges – were taken from German troops in 1944-5. This simply makes their importance seem greater than it was.

**178 BELOW**

The Danish Madsen light machine-gun fed from a top-mounted box magazine. Despite a curious breech-locking system, which is often regarded as technically inferior, the Madsen was outstandingly successful in many pre-war trials. This was once an aircraft observer's gun, but has been converted for ground use. Note the bipod, the cocking handle on the right side of the breech, and the simple butt clamped to the recoil-spring tube. *By courtesy of The Pattern Room, Enfield.*



# SIX

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## THE MACHINE-GUNS

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The heavy automatic weapons of the Third Reich, indigenous and captured guns alike, from the Maxim to the MG.45.



# Machine-guns

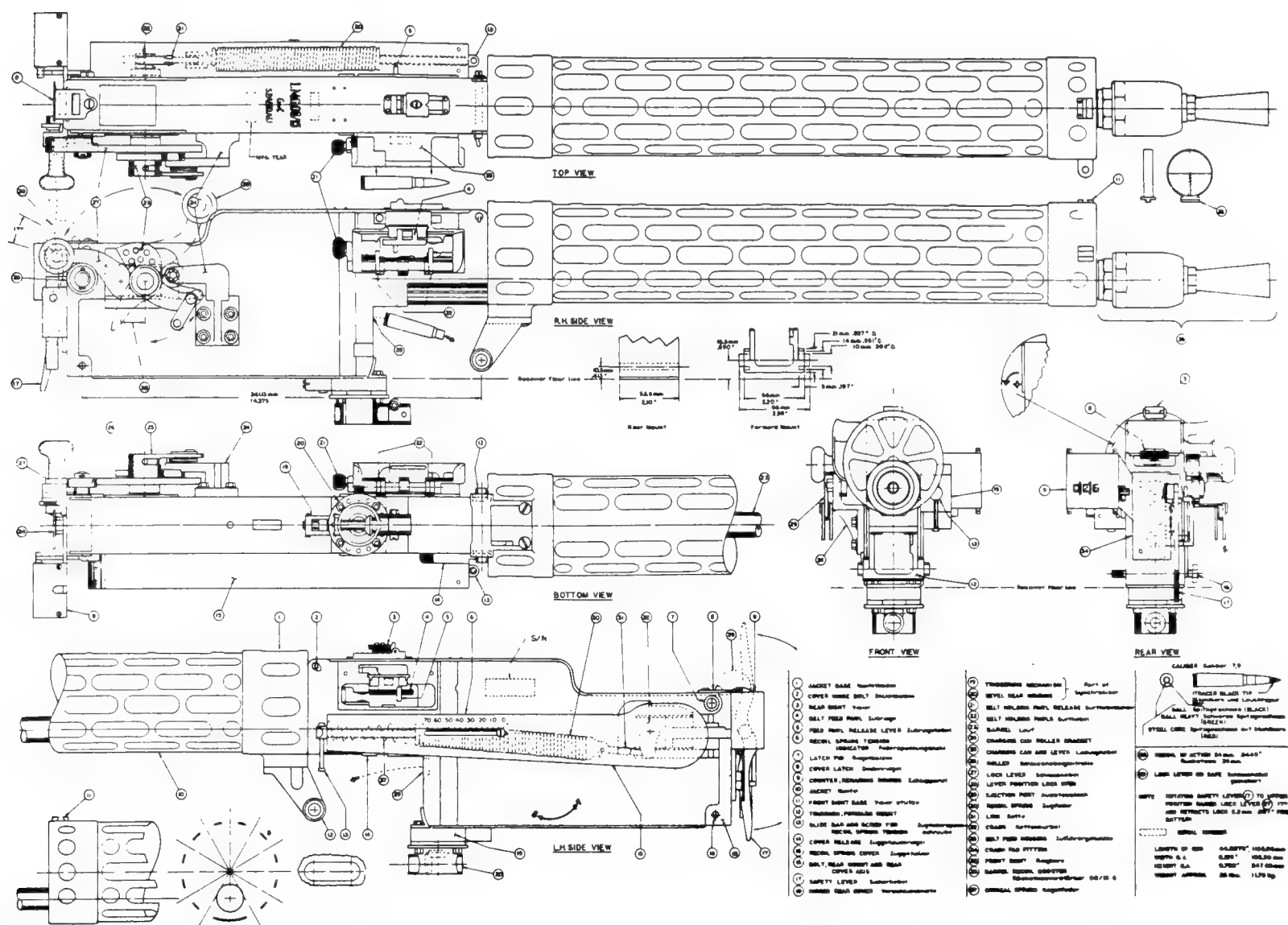
Germany's armed forces possessed a selection of machine-guns in November 1918. The principal service weapons were water-cooled MG.08 and MG.08/15 Maxims, but there were also many air-cooled Maxims and Parabellums – the latter with an inverted toggle-lock – plus smaller numbers of Bergmann MG.15 and a tiny number of water-cooled Dreyse ground guns. Attempts had been made to introduce a simplified ground gun for universal ground use (the so-called Einheits-maschinengewehr 16), but this water-

cooled adaptation of the MG.08/15 was unsuccessful. Only its tripod had been adopted as a substitute for the Schlitten 08.

Large numbers of ex-Russian Maxims had been impressed, as had some of the German navy Maxims and the few surviving pre-1908 ground guns. Vickers and Lewis Guns had been taken from the Western Allies, while ex-Austrian Schwarzlose machine-guns were also used in small numbers. 8mm-calibre Madsen machine-rifles had been purchased in

Denmark, mainly for the Gebirgsjäger; similar guns chambering the rimmed 7.62×54mm round had been taken from the Russians.

Exactly how many guns had been made for the German army prior to 1918 is impossible to determine. Only about 2,000 were available in August 1914, but production of the Maxims, in particular, had been very large; the Inter-Allied Military Control Commission ordered the destruction of all but four of 87,950 machine-guns collected together in 1919!







### 179 ABOVE

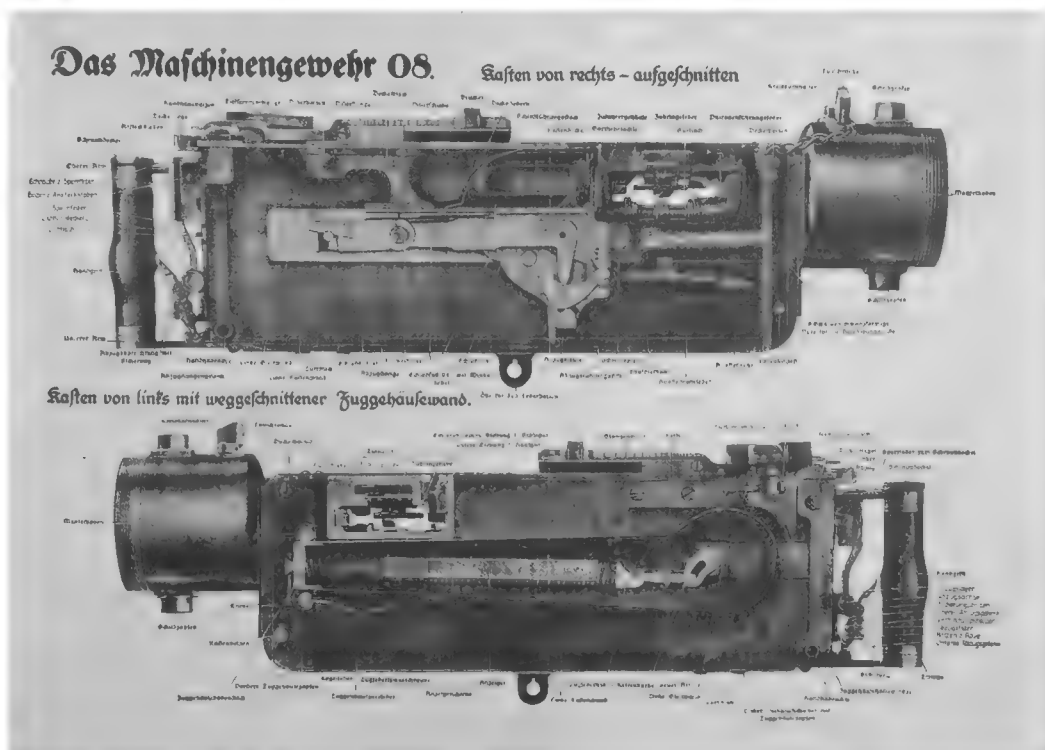
This illustration of an abortive demonstration of a Maxim gun to the Chinese ambassador to Britain – who allegedly said he could find cheaper ways of chopping down trees – is remarkable chiefly because it shows the extent of Anglo-German co-operation at the turn of the century. Hiram Maxim stands at the far right, while in the background, beside the tree, is Sigmund Loewe. Loewe's family controlled DWM at this time, while he was a director of Vickers, Sons & Maxim. *Courtesy of Vickers Ltd.*

### 180 LEFT

A general-arrangement drawing of the LMG.08/15, the air-cooled aircraft derivation of the standard infantry Maxim. *US Army official; courtesy Musgrave & Oliver.*

### 181 RIGHT

The Maxim-system MG.08 was the principal heavy machine-gun of the Reichswehr. Replaced in front line service by the MG.34 in the late 1930s, survivors were passed to the police. This views shows details of the lockwork. From Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.



## 182 RIGHT

This posed photograph of a MG.08 crew from 4.Schlesisches Infanterie-Regiment Nr.157 shows the care with which the Germans built machine-gun emplacements when time (and material) permitted. The original photograph is so clear that the name of Emil Busch AG, Rathenow, may be read on the machine-gun sight. *LPI archives.*

The Treaty of Versailles severely restricted the size and strength of the German armed forces (Reichswehr), Article 180 permitting issue of only 84,000 Gew.98, 18,000 Kar.98 AZ, 1,926 machine-guns, 252 trench mortars ('Minenwerfer') and 288 artillery pieces. Complaints about the niggardly scales of issue allowed the machine-gun quota to rise to 2,336 in 1921. Machine-guns were also retained for police 'internal security' purposes, though large clandestine stock-piles were kept well away from Allied view.

## THE MAXIMS

The Maxim had its origins in the 1880s, and had excited the interest of many armies in the remaining years of the nineteenth century. Germany had purchased quantities from 1896 onward, mainly for naval use, and then issued small numbers of MG.99 and MG.01 for field service trials before adopting the Maschinengewehr Modell 1908 ('MG.08'). A production licence had already been granted by Vickers, Sons & Maxim to Deutsche Waffen- und Munitionsfabriken of Berlin,<sup>1</sup> and the rifle factory at Spandau delivered the first government-made guns in 1910. DWM made a version of the Maxim on a light-weight tripod for export, as the factory model 1909, as well as the 'S.M.Gew.M1913' (or Parabellum) which was basically a lightened Maxim with an inverted toggle-lock. Despite detail changes, however, the German MG.08 remained quintessentially Maxim; the barrel and breechblock retreated through about 17mm, securely locked together, until the barrel stopped and a locking toggle broke upward to allow the breechblock to run back alone. After withdrawing a new round from the fabric

1. Substantial portions of the Vickers, Sons & Maxim and Deutsche Waffen- & Munitionsfabriken shareholdings were held by the Loewe family - which explains the links. Sigmund Loewe served as a director of Vickers, Sons & Maxim until his death in 1903.





feed belt on the rearward stroke, the mechanism returned to re-load. The toggle then snapped back into place and the mainspring pushed the barrel/breech assembly back to its initial position.

The Maxim had a steady, efficient but slow action; the cyclic rate of the first guns was not much more than 300rpm. During the First World War, a recoil booster or Rückstoßverstärker S was added to increase the fire-rate to about 450rpm by deflecting propellant gas to increase rearward thrust on the barrel.

The MG.08 was heavy and cumbersome, weighing about 26.5kg, and the perfected sledge mount (Schlitten 08) contributed an additional 32kg. When the first Lewis light machine-guns were captured on the Western Front, the Gewehrprüfungskommission immediately refined the basic Maxim into a more mobile weapon. The MG.08/15, credited to Oberst von Merkatz of the GPK, emerged with a small-diameter barrel jacket, thinner receiver walls than the MG.08, a new pistol grip and butt, a bipod and a simpler back sight. At nearly 18kg, the MG.08/15 was appreciably heavier than the guns it was designed to face; however, being based on well-tried components, it was much more reliable than the Lewis Gun. As it was also water cooled, it could sustain

### 183 RIGHT

The MG.08, from Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.

### 184 BELOW RIGHT

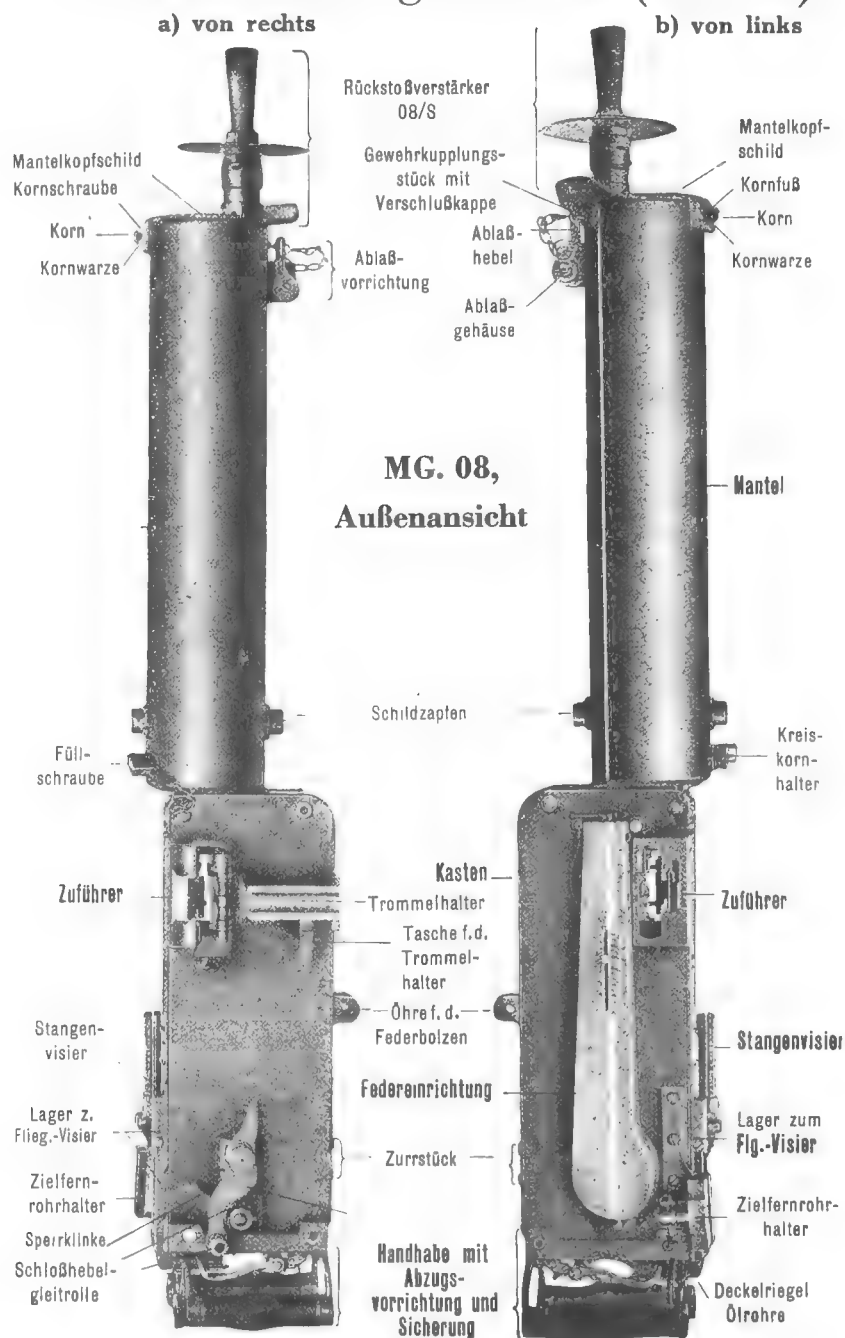
The MG.08/15 was a lightened bipod-mounted adaptation of the water-cooled MG.08. Cumbersome by the standards of the 1930s, it was sturdy, reliable and could sustain fire far longer than some of its major rivals. *Courtesy of Ian Hogg.*

fire much better than its air-cooled rivals.

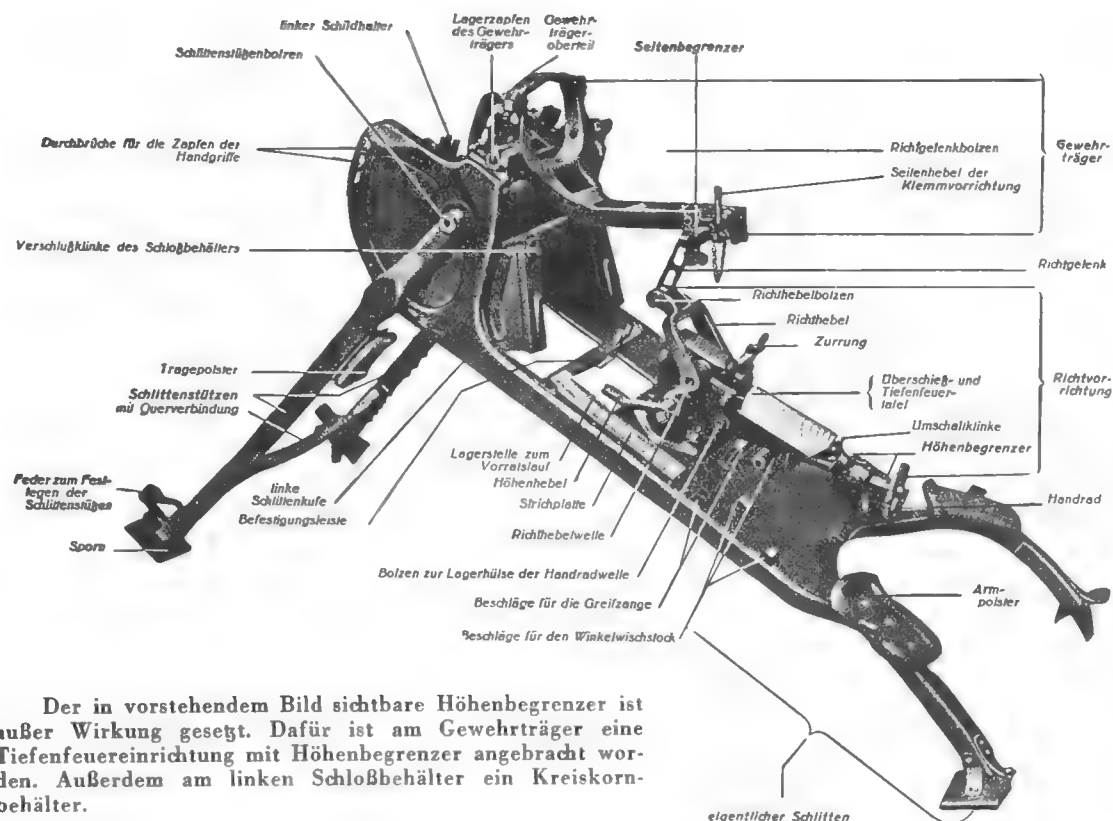
Production of German Maxims was entrusted during the First World War principally to Deutsche Waffen- und Munitionsfabriken ('DWM') in Berlin; the government rifle factories in Erfurt and Spandau; Rheinische Metallwaren- und Maschinenfabrik ('Rh.M. & M.F.') in Sömerda; Siemens & Halske ('S. & H.') in Berlin; and Maschinenfabrik Augsburg-Nürnberg ('M.A.N.').

Few changes were made to the Maxims during the Reichswehrzeit, apart from the

## F. Das Maschinengewehr 08 (MG. 08).

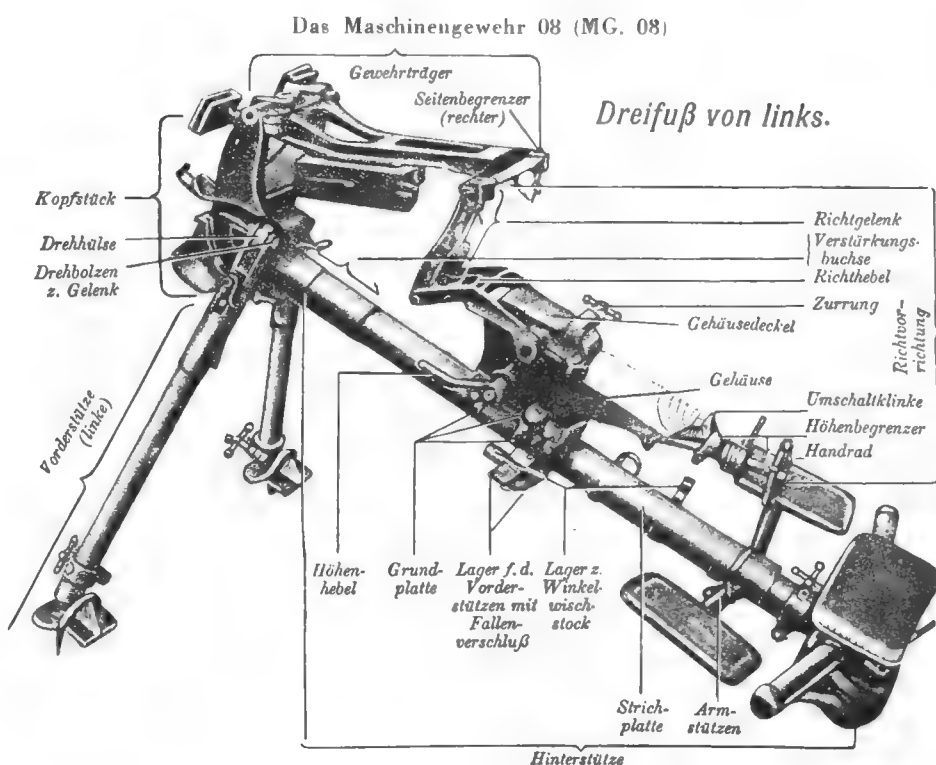






Der in vorstehendem Bild sichtbare Höhenbegrenzer ist außer Wirkung gesetzt. Dafür ist am Gewehrträger eine Tiefenfeuereinrichtung mit Höhenbegrenzer angebracht worden. Außerdem am linken Schloßbehälter ein Kreiskornbehälter.

eigentlicher Schlitten



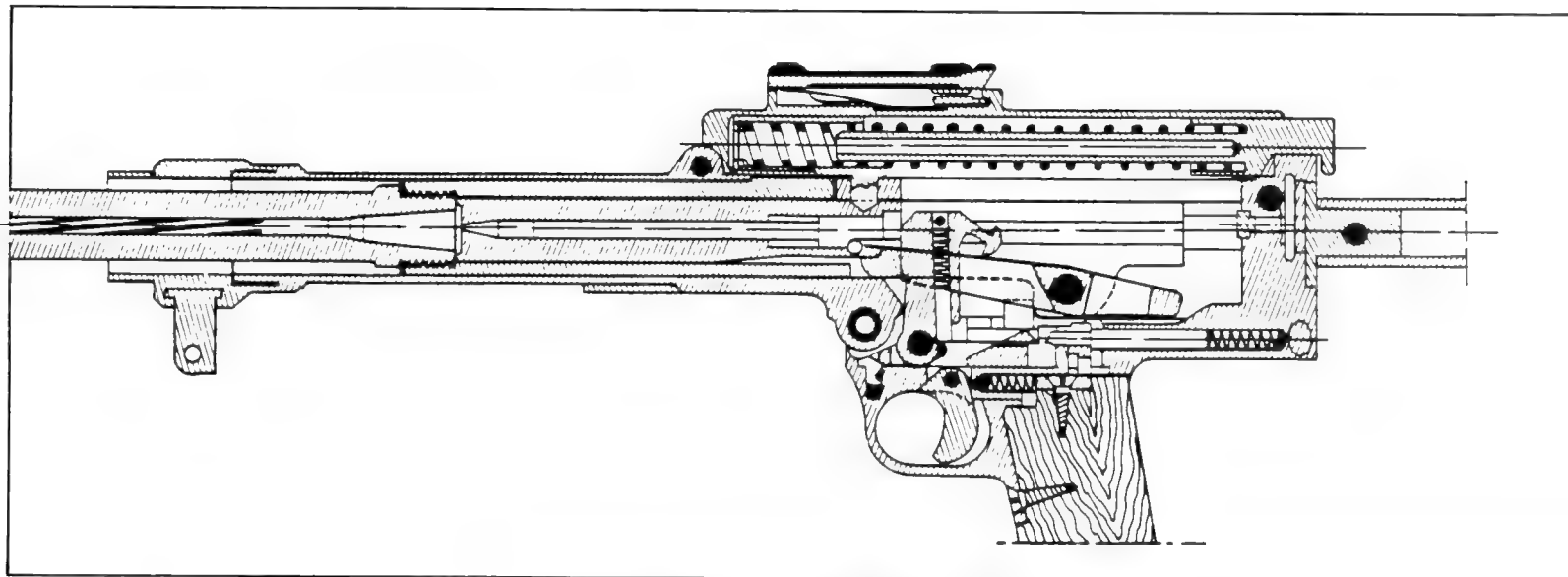
Schlitten in hoher Stellung, Schlittenaußenstück senkrecht, Umschaltklinke hochgestellt, Höhenbegrenzer angezogen

#### 185-187 ABOVE AND LEFT

The MG.08 generally appeared on the MG-Schlitten 08 (top), a sled-type mount as old as the gun itself, which could be set for anti-aircraft fire with a special adaptor (above). It could also be mounted on the simpler Dreifuß 16 (left) developed during the First World War for the Einheitsmaschinengewehr. From Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.



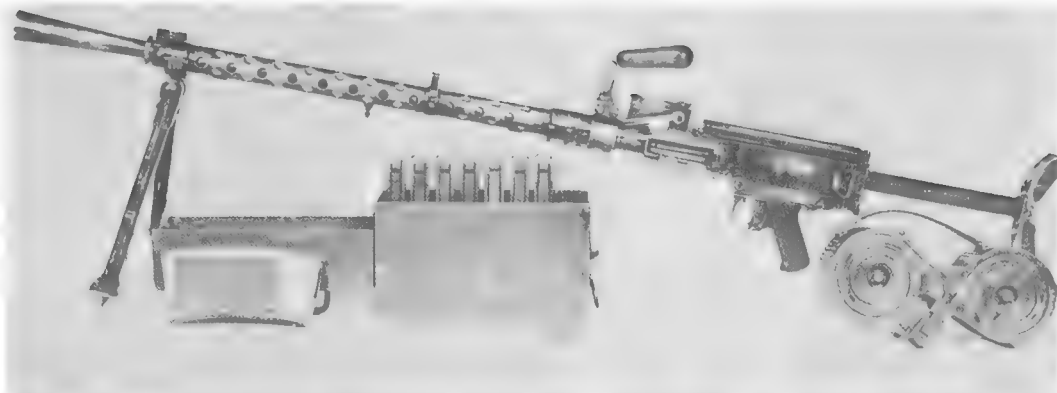


**189 ABOVE**

Longitudinal sections of the 1918-model air-cooled Dreyse machine-gun, the strut-locking system of which was perpetuated by the MG.13.

**188 LEFT**

Reichswehr-era soldiers practice with the MG.08 and Schlitten 08, to which the anti-aircraft adaptor has been attached. The marks on the gun show that it belongs to the machine-gun company of 8.Infanterie-Regiment, while the bands round the firers' helmets clearly indicate that manoeuvres are in progress. From a contemporary photograph, c.1930; *LPI archives*.

**190 RIGHT**

The MG.13, or Dreyse, was the first new light machine-gun to be issued in the Reichswehr. Despite its shortcomings – magazine feed, fixed barrel – the MG.13 proved sturdy and acceptably effectual. They could be issued with the box or saddle-drum magazines pictured here. Note the hinged butt. *LPI archives*.

**191 BELOW RIGHT**

A 3.7cm Pak.36 and an MG.13, captured by British troops near Abbeville in 1940. *By courtesy of Ian Hogg.*



addition of anti-aircraft sights, adapting the back sights for sS ball ammunition, modifying the feed for canvas or metal-link belts, and adding limit-stops and trajectory tables on the Schlitten 08.

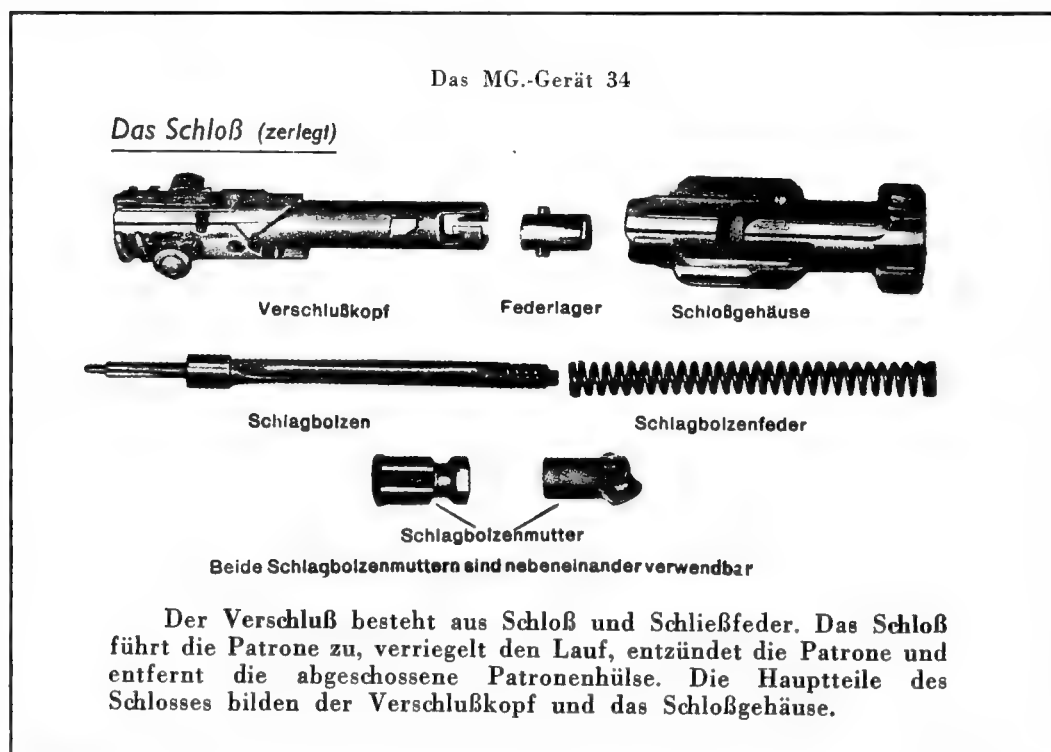
## FROM THE DREYSE TO THE MG.34

It was clear that the service life of the Maxims would be comparatively short; in addition, the heavy guns were not suited to increasingly mobile warfare. A new gun was clearly needed. The result was the so-called Dreyse MG.13, known during

development as 'Gerät 13' to disguise its true purpose, introduced in 1928. Ostensibly the work of Simson & Co. of Suhl – the sole manufacture the Allies trusted with automatic weapons – the MG.13 was designed by Rheinmetall and apparently built secretly in the company's Sommerda factory. Here, all the previous 'Dreyse' rifles, pistols and machine-guns had been made. It has even been suggested that MG.13 were rebuilt from pre-1918 Dreyse air-cooled guns, but this is most improbable. The MG.13 was simply a minor adaptation of the older Dreyse design, sharing a recoil-operated breech-lock in which a pivoting bar in the receiver (above the trigger/pistol-grip assembly) locked the bolt securely behind the chambered cartridge. The bar was placed under considerable compressive stress at the instant of firing and could not compare with the strength of the MG.34 interrupted-screw or the MG.42's pivoting rollers.

The MG.13 typified its period, with a bulky squared receiver and a long barrel within a comparatively small-diameter casing pierced with holes to improve the circulation of air. The trigger, an early form of the MG.34 pattern, activated a hammer striking a long firing-pin running longitudinally through the bolt body. The upper segment of the trigger, marked 'E' for *Einzelfeuer*, gave single shots; the lower portion, marked 'D' for *Dauerfeuer*, controlled continuous or automatic fire.

The MG.13 was very much lighter than the old water-cooled MG.08, but could not sustain fire as effectually. Removing the barrel necessitated partially dismantling the gun, unlatching the lowermost portion of the receiver (which was then swung downward), removing the bolt unit and then withdrawing the barrel from the receiver – by no means easy if the barrel was red-hot. Though at least one attempt was made to mount the MG.13 on a Danish Madsen tripod, for assessment as a medium machine-gun, the lack of a readily exchangeable barrel and reliance on conventional box-magazine feed doomed the experiments to failure. The standard box magazine held a mere 25 rounds; though a special twin-drum 75-round *Patrontrommel 13* was developed in the mid 1930s, it was heavy, difficult to load, and hung awkwardly.



The short-barrel MG.13k was mounted in tanks, vehicles and some aircraft prior to the advent of the MG.34 and MG.15; when sufficient new guns became available, most surviving MG.13 and MG.13k were sold to Spain for service in the Civil War (1936-9); others became the Portuguese 'Metralhadora M/938'. Thus the MG.13 was comparatively rarely encountered by Allied forces, even during the last desperate days of 1945 when every serviceable weapon was pressed into service.

The MG.13 was usually mounted on the *Zweibein 13* (bipod), which could be fixed either at the muzzle or the rear of the barrel casing ahead of the carrying handle. The guns were usually encountered with flash-hiders and a tubular

metal-frame butt with a clamshell-type shoulder pad. The butt could be swung back along the right side of the receiver to reduce overall length. Alternative mounts included the *Dreifuss 08/15*, necessitating a special 'adaptor' (*Kupplungstück*), and the *Dreifuss 34* to which the MG.13 could be attached directly. Mounts for armoured vehicles and fortification use were also available.

The MG.13 was sufficiently effectual to remain in limited front-line service into the early years of the war: indeed, a few lasted in second-line, police and *Volkssturm* service until May 1945. But it was no more than a stop-gap. German designers had been attempting to develop an *Einheitsmaschinengewehr* ('universal machine-gun') since the First

**192 LEFT**

The bolt of the MG.34. Note the locking lugs ('Verriegelungskämme') and the rollers used to rotate the bolt-head ('Ansätze m. Rollen'). From Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.

**193 BELOW**

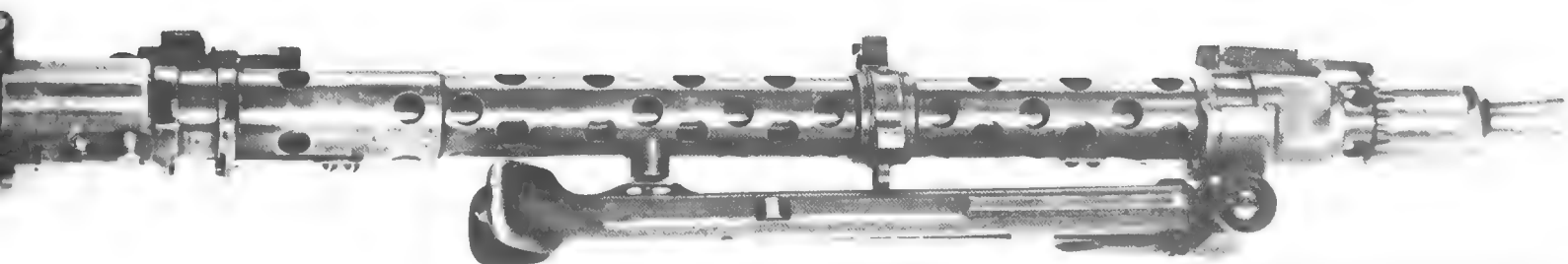
The MG.34 is generally credited to Rheinmetall, but culled features from the earlier MG.13 and also incorporated Mauser principles in its bolt. The first German Einheitsmaschinengewehr to reach service status, it was beautifully made, complex, very expensive and had unbelievably elaborate mounts. Unfortunately, it proved to be temperamental in adverse conditions, unless kept clean, and was supplemented by the simpler MG.42 during the war. By courtesy of The Pattern Room, Enfield Lock.

World War, hoping to replace all the service guns at a single stroke. Several prototypes had been made prior to 1930 – including one by Mauser and another in the ostensibly Swiss Solothurn factory partly owned by Rheinmetall – but none had proved to be ideal.

Rheinische Metallwaren- und Maschinenfabrik, known by 1927 as Rheinmetall AG, had been a leading producer of smallarms and munitions during the First World War – so prominent, indeed, that the Inter-Allied Military Control Commission forbade the company to make anything but a few field-guns. To evade such restrictive controls, Rheinmetall had participated in the formation of Hollandsche Artillerie-Industrie en Handelsmaatschappij (HAIHA) in the Netherlands and, when this enterprise failed to prosper, had established a Swiss subsidiary – Waffenfabrik Solothurn AG – before an arrangement with Steyr.

Rheinmetall's prototype light machine-gun, Rh 29, designed by Louis Stange, was soon developed into the Solothurn S2-200. Offered for commercial sale in virtually any calibre the purchaser cared to specify, the S2-200 generated little interest outside the confines of Europe other than an isolated purchase by El Salvador in 1932. However, the gun was adopted by the Austrian and Hungarian armies, mass-production commencing immediately in Steyr and Budapest. There were three basic variants: the Austrian M1930 and the Hungarian 31.M, which both fired a rimmed bottleneck 8mm cartridge, and the later Hungarian 43.M that shared the German 7.9mm cartridge and an MG.13-pattern box magazine.

The principal novelty in Stange's design was the method of locking. As the barrel, barrel extension and bolt recoiled, a rotating collar on the barrel extension was cammed out of engagement with an

**194 RIGHT**

German troops advance across open country during the opening stages of the Polish campaign in September 1940. The soldier in the foreground carries an ammunition box for an unseen MG.34, plus a case for a single spare barrel (on his back). The case appears to be serially numbered to the gun. *Author's archives.*





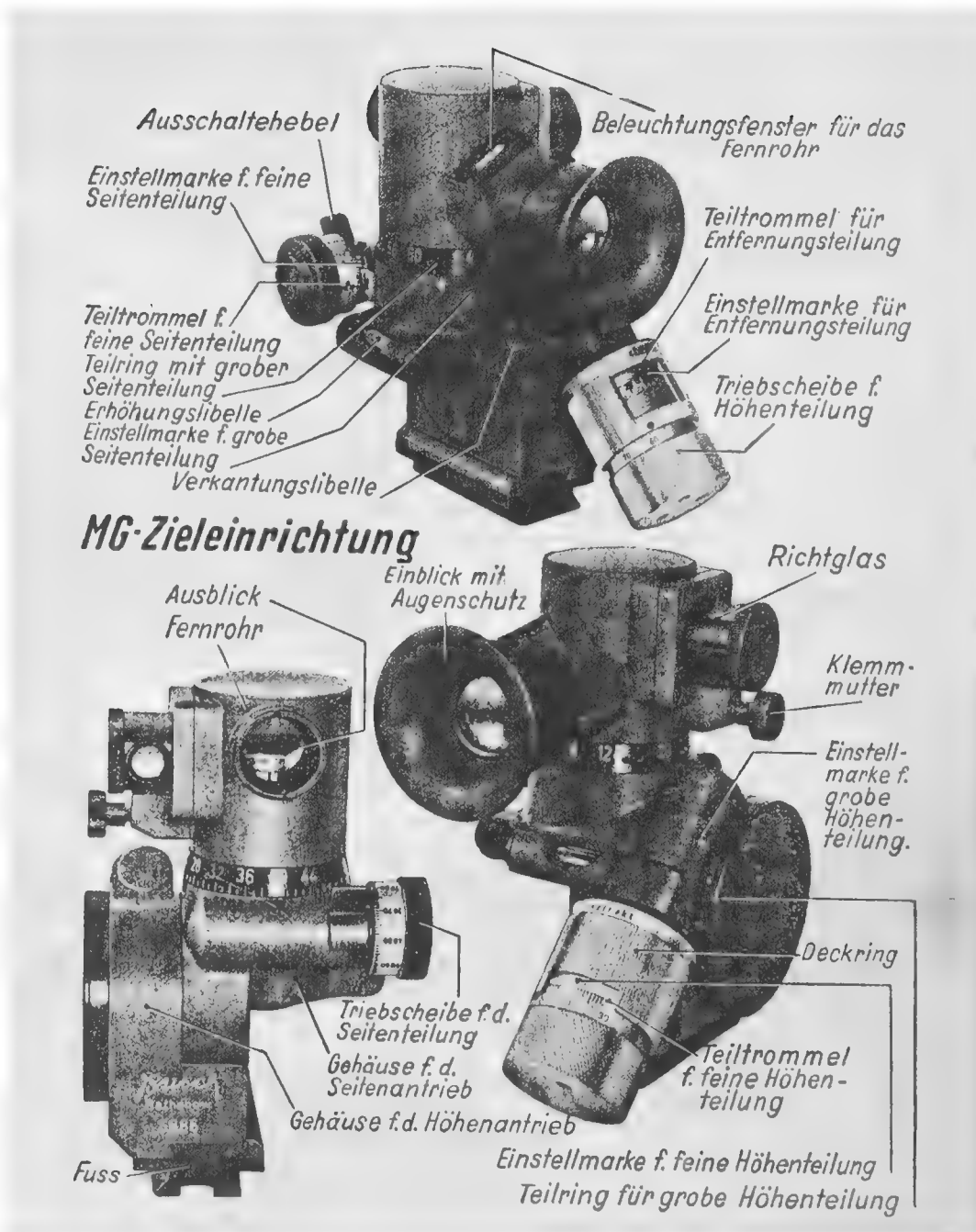
interrupted screw on the bolt. When the barrel and barrel extension stopped, the bolt reciprocated alone. It was then returned by the recoil spring and stripped another cartridge into the breech.

The Solothurn gun was efficient enough to serve the Austrian and Hungarian armies for many years, survivors being impressed into the German armies initially after the Anschluss and then when the combined Germano-Hungarian Front collapsed in 1944. The principal drawbacks of the S2-200 reflected those of the MG.13: detachable box magazines and an ineffectual barrel-change system limited sustained-fire capability. The basic principles of the Stange collar-lock were perpetuated in the Rheinmetall-developed aircraft guns – MG.15, MG.17 and MG.131 (see AIRCRAFT GUNS).

The prototype Mauser machine-guns were designated MV1931 and MG32. Developed covertly through Metallwarenfabrik Kreuzlingen AG in Switzerland, the MV1931 shared some of the features of the MG.13 – the magazine, a trigger capable of firing single shots or fully automatically, and a recoil-operated lock. The MG32, generally credited to Ernst Altenburger, had a rotating bolt-head that locked directly into the barrel rather than the barrel-extension. The Mauser machine-gun was not sufficiently advanced to attract much interest and the project – later resurrected to become the MG.81 aircraft gun – lay dormant by 1934.

Just as progress with the Einheitsmaschinengewehr concept seemed to be stagnating, the Heereswaffenamt decided to amalgamate the best features of the competing weapons. Issued for troop trials in 1936-7 and formally approved on 24 January 1939, the Maschinengewehr 34 had been perfected in Sömmerda under the supervision of Louis Stange and Major Dipl.-Ing. Ritter von Weber. It perpetuated features of the MG.13 within the general appearance of the Solothurn (Rheinmetall) S2-200, but the breech-lock combined Stange's interrupted-screw with the cam-and-roller rotation of the Mauser. Unlike the Solothurn S2-200, however, the MG.34 bolt rotates; the former's moves straight back.

A recoil booster was fitted to the muzzle of the MG.34 to increase the cyclic rate and improve reliability. The result was undoubtedly the most impressive



gun of its day, as it had been equipped with mounts to suit every possible occasion. By the end of the Second World War, the MG.34 had been issued with the Zweibein 34 (bipod), Dreifuss 34 (tripod), MG-Lafette 34 (buffered quadrupod), Fliegerdrehstütze 36 (pedestal), Zwillingssockel 36 (twin anti-aircraft mount) and the MG-Sockel 41. The breadth of the MG-Gerät 34, or 'machine-gun system', was one of the wonders of pre-1939 ordnance.

Unfortunately, such incredible complexity – the Solothurn-inspired buffered mount alone had more than two hundred parts – proved to be a terrible production handicap. The MG.34 could not

be made in large enough quantities to satisfy wartime demand, when quantity rather than quality was needed. The complex bolt system required particularly careful machining. Combat experience in Russia and North Africa soon showed that key tolerances were much too fine, and that mud, sand or grit often jammed the action. When clean, the MG.34 was extremely efficient; when dirty, or in extremes of temperature, it was scarcely a match for the Degtyarev DP, even though the Russian gun lacked its German rival's capacity for sustained fire.

There were several versions of the MG.34, the basic gun being made Gustloff-Werke in Suhl (formerly Simson & Co.);



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**195 LEFT**

The MG-Zieleinrichtung, designed and made by Busch of Rathenow, was used with the MG-Lafette 34. In complexity, expense and high-quality performance, its attributes mirrored the gun's. From Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.

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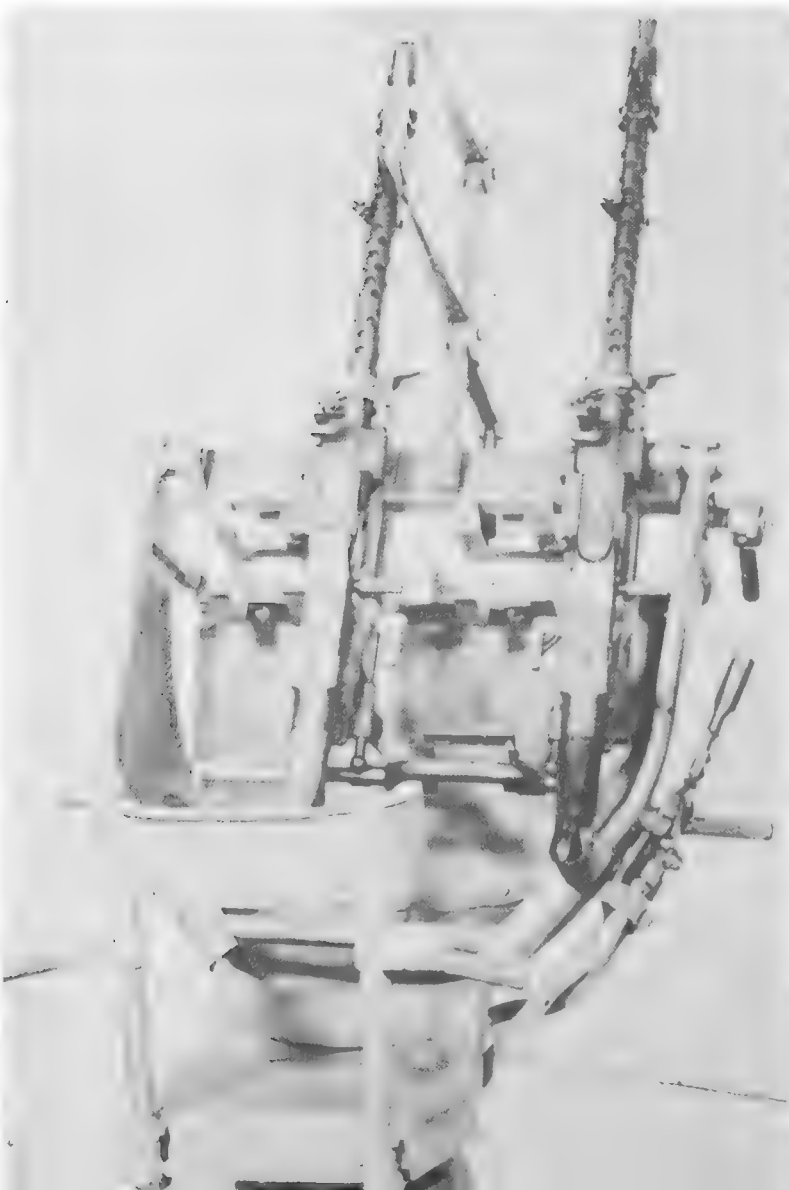
**196 RIGHT**

The business end of the MG.34. *By courtesy of the Trustees of the Imperial War Museum; negative no. STT3060.*

**197 BELOW**

The MG.34 was often jammed by mud and dust, requiring constant cleaning if efficiency was to be maintained. Here the man in the foreground cleans the gun, while two of his colleagues attend to the MG-Lafette 34. The soldier on the left is cleaning the spare barrel with a makeshift pull-through, the barrel-case lying on the bench in front of him. The fifth man (on the far right) appears to be frying breakfast! *LPI archives.*





**201 ABOVE**

Used in small quantities by the Waffen-SS, pending the delivery of sufficient MG.34, the Knorr-Bremse LH/36 was a fragile-looking gun. Though its action was acceptably efficient, the parts were not robust enough to withstand the rigours of service.

*Courtesy of Ian Hogg.*

**198 ABOVE LEFT**

The MG.34S was a short-lived derivative of the MG.34 with a much higher fire-rate than normal, and substantial internal changes to simplify production. However, the success of the prototype MG.42 ('MG.39/41') was such that the MG.34S was abandoned. This gun, no.501, dates from 1942. Note the repetition of the serial number on the left side of the butt. *By courtesy of Ian Hogg.*

**199 BELOW FAR LEFT**

The anti-aircraft pedestal mount for twin MG.34, known as the Zwillingssockel 36. *LPI archives.*

**200 BELOW LEFT**

An MG.34 gun-crew man their gun during street fighting in France in the summer of 1940. Note the MG-Lafette 34. *By courtesy of the Trustees of the Imperial War Museum; negative no. TT2864.*

Maget in Berlin; Mauser-Werke AG in Berlin-Borsigwalde; Steyr-Daimler-Puch AG in Steyr/Oberdonau; and Waffenwerke Brünn AG in Brno in occupied Czechoslovakia. From September 1939 until the end of the war, 345,109 guns were accepted by the HWaA, peak production occurring in 1941 (81,467) with an additional surge in 1944. Guns were also supplied to Portugal, where they served into the 1970s as Metralhadora Mo.944, while production continued in the Brno factory to equip the postwar Czechoslovakian army.

The first two series of semi-experimental guns, numbered between 1 and about

2300, had distinctively machined feed covers, rate reducers built into the action to vary the cyclic rate (700-1,000rpm), and wood butts. The production variant abandoned the rate reducer, which was a superfluous complication, and was ultimately made with a plain stamped feed cover and a synthetic butt.

When the MG.34 was being developed, the Luftwaffe had considered adapting it for aerial use. However, the weight of the MG.34, plus such land service-inspired features as the selective-fire trigger and readily exchangeable barrel, prevented a satisfactory transformation. The OKL subsequently purchased the Rheinmetall-developed MG.15 and when this was found wanting, turned instead to the Mauser MG.81.

The MG.34 machine-gun was easily adaptable for tank and vehicle use. An armoured barrel jacket, solid for two-thirds of its length, replaced the standard pierced-sheet pattern. Butt, bipod-retaining stud and anti-aircraft sights were removed to allow the guns to be clamped in special vehicle mounts. Spare-parts kits comprising a butt, a bipod and a special clamp-mount for the anti-aircraft sight were carried aboard most vehicles to enable the guns to be dismounted for field service.

The standard MG.34, which measured 1,220mm overall and weighed a little over 12kg with its bipod, could feed from a belt (Patronengurt 34) or a detachable 75-round saddle drum (Patronentrommel 34). Cyclic rate was reckoned to be about  $850 \pm 50$ rpm, depending on the individual gun and the feed system: friction and weight slowed the belt-feed rate compared with spring-feed from the

drum. Barrel life, originally about 6,000 rounds, was greatly prolonged by chrome-plating the bore and chamber during the war.

After experience in Poland and France, the HWaA requested an increase in the fire-rate as detailed studies had shown – at least in the MG.34 – that dispersion in short bursts could be reduced. The experimental MG.34S subsequently achieved cyclic rates as high as 1,650rpm, but soon failed as its parts could not sustain such a hammering. The gun measured 1,120mm overall and had a 560mm barrel; the lock was modified, an improved recoil booster had been fitted, and the recoil buffer was greatly improved.

The MG.34S led to the MG.34/41, 1,707 of which, made early in 1942, were despatched to the Eastern Front. To simplify manufacture and increase the cyclic rate to about 1,250rpm, virtually every part of the original gun had been redesigned: the bolt had lugs instead of an interrupted-thread, the feed arrangements were refined, and the trigger reduced to fully-automatic operation only. However, as the prototype MG.42 was performing well, the 34/41 was abandoned in January 1943 and the standard MG.34 remained in production until the end of the war.

## OTHER GERMAN GUNS

The comparatively leisurely development of the new Einheitsmaschinengewehr meant that virtually all guns made before 1940 went straight to the army. Few were

available for the Luftwaffe ground forces or the Waffen-SS, which was still regarded as politicians playing at soldiery.

The Oberkommando der Luftwaffe (OKW) asked Rheinmetall to produce a refinement of the Solothurn S2-200, which entered service as the MG.15. The comparative failure of this gun, which fired too slowly, then forced the Luftwaffe authorities to turn to Mauser – still piqued by the choice of Rheinmetall to develop the MG.34 – to transform the dormant MG32 into an aircraft machine-gun. The result was the MG.81,<sup>2</sup> more efficient in some ways than the MG.34 though, until the end of the war at least, never seen in a ground role.

The Waffen-SS also wished to acquire machine-guns of its own, preferably outside regular procurement channels where the Wehrmacht was generally accorded priority. Unfortunately, most of the major machine-gun manufacturers – especially Mauser and Rheinmetall – were already involved with the MG.34 and MG.81. Krieghoff, which had unsuccessfully tried to interest the Luftwaffe in a machine-gun in the mid 1930s, was in no position to proceed. It seemed that only Knorr-

Bremse of Berlin, an automotive brake-manufacturing company with no previous experience of smallarms production, had spare production capacity.

Knorr-Bremse had acquired the rights to a German-financed light machine gun designed in Sweden by Lauf & Przikalla and patented in 1933-4. Prototypes of the 6.5mm LH/33 had been unsuccessfully offered to the Scandinavian governments, and improved 7.9mm-calibre LH/35 and LH/36 variants were hawked around Germany once Lauf's patents had been assigned to Knorr-Bremse. The Knorr-Bremse LH/36 was subsequently purchased by the Waffen-SS, but was speedily replaced by vz/26 and vz/30 machine-guns after Czechoslovakia fell. Surviving Knorr-Bremse guns were apparently shipped to Finland and expended during the Winter War. Not much was wrong with their basic design but, as the manufacturer had no experience of gunmaking, some components were not robust enough to withstand service rigours.

The LH/36 was a very distinctive lightweight weapon, with a notable gap between the barrel and the gas port/piston-tube assembly above it. A prominent combination carrying- and barrel-changing handle hung down below the feed

aperture, into which a detachable twenty-round box magazine could be inserted.

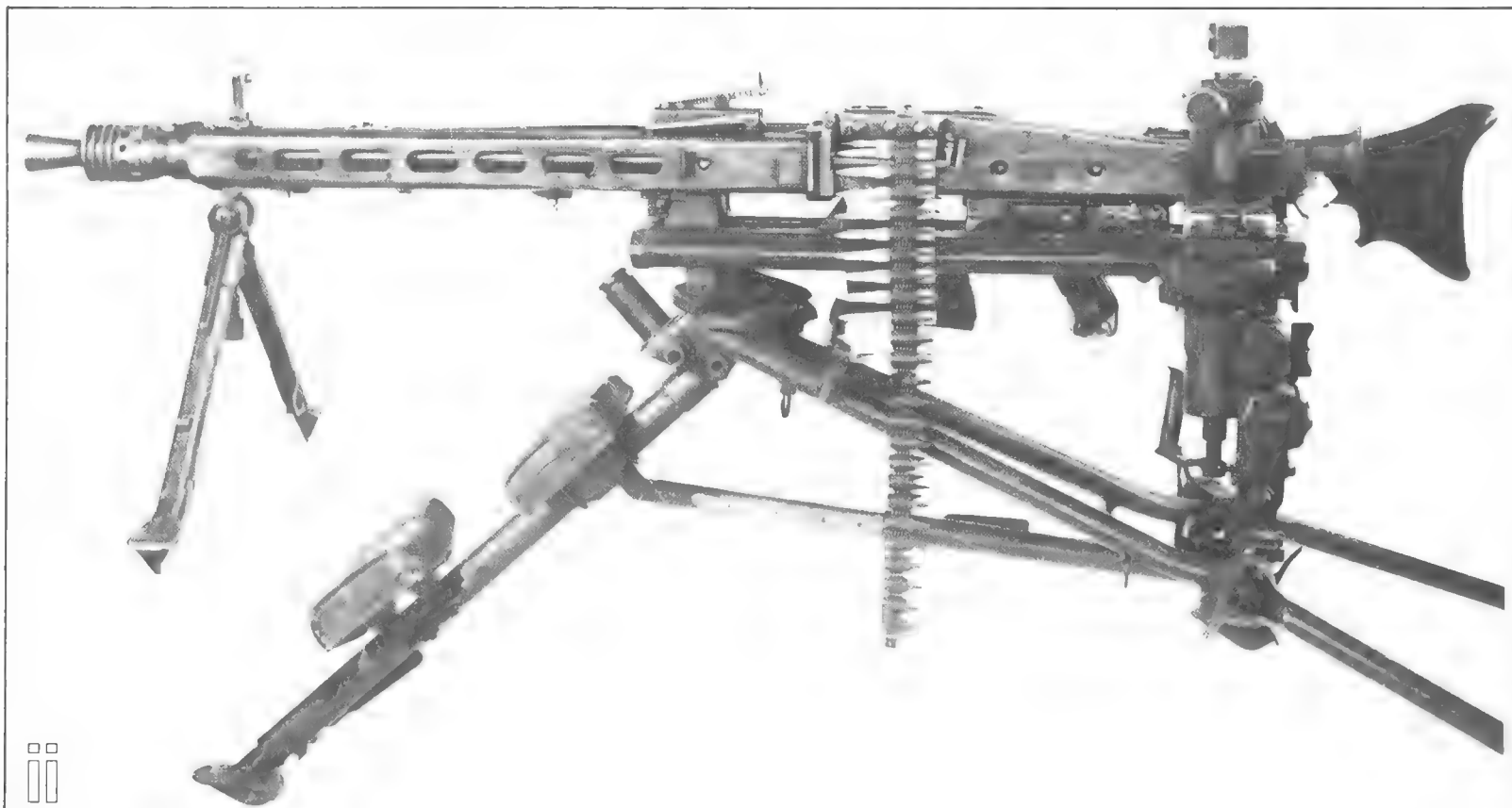
## THE MG.42

Even as the MG.34 was beginning its field trials, the HWaA realized that the Einheitsmaschinengewehr was too complex and much too expensive to mass-produce. Finally, after a time-and-motion study completed in 1937 under the enthusiastic championship of Dr.-Ing. Peter, even the OKH was forced to agree. The race to find a simpler gun had commenced even before the MG.34 had been formally adopted.

The biggest problem was simply that though metal-stamping would be essential to lift production levels, the technology was still in its infancy. But though work needed to be done before a simplified design would encounter success, a draft specification was sent to three leading manufacturers in February 1937. Only one company had experience of weapons design, the others being production specialists.

Rheinmetall-Borsig AG and Stübgen AG of Erfurt submitted gas-operated designs,

2. A machine-gun ('MG') of 8mm-calibre ('8'), the first ('1') to be commissioned by the OKL.



**202, 203 LEFT AND ABOVE**

The MG.42, seen here on the standard bipod (Zweibein 42, i) and the complicated MG-Lafette 42 (ii), was the perfected German Einheitsmaschinengewehr. Characterized by an unusually high rate of fire, which gained it the nickname of "Hitler's Saw", the MG.42 was wasteful of ammunition and its buffered mount was less than stable in prolonged support fire unless heavily weighted. However, the gun was robust, simple, effectual and had important repercussions on the design of weapons in its class after 1945. *By courtesy of The Pattern Room, Enfield Lock.*

**204 RIGHT**

Looking remarkably cheerful in spite of declining German fortunes, this Luftwaffe machine-gunner was pictured with his MG.42 on 20 March 1945. *LPI archives.*

while Grossfuss Metall- und Lackierwarenfabrik of Döbeln proposed the recoil-operated Grüner system. Grossfuss then built a prototype that convinced the Heereswaffenamt of the merits in its roller-locking system.

Prototypes of the competing designs had all been completed by April 1938, when trials revealed the unacceptability of the Grossfuss barrel-change. However, an improved Grossfuss machine-gun was ordered as the Rheinmetall and Stübgen designs had both been rejected. This incorporated a one-piece receiver and a simplified barrel-changing system; it performed well enough to inspire work on a

series of semi-experimental guns culminating in the MG.39 – fifty of which tested at the Döberitz infantry school – and the MG.39/41, the final pre-production pattern, which successfully passed final field trials in the autumn of 1941.

The MG.42 was approved for mass-production in the summer of 1942. Though Grüner had retained the basic MG.34 concept, the standard metal-link ammunition belt and the multiplicity of mounts, the MG.42 was far easier to make than its predecessor. In 1944, the cost of an MG.42 was estimated as 250 Reichsmarks compared with 312 for an MG.34. Many dimensional tolerances were much wider than





had previously been deemed acceptable by the procuring agencies, and the wholesale use of stampings, pressing and welding was viewed with horror by the gunmaking fraternity. By comparison with the pre-war MG.34, which displayed excellent surface finish and an unimpeachable fit of parts, the MG.42 was very crudely made. However, it was extremely sturdy, despite a much higher rate of fire, and had an exceptionally simple barrel-change system. By the end of the Second World War, more than 400,000 MG.42 had been made by Grossfuss in Döbeln, Gustloff-Werke in Suhl, Maget in Berlin, Mauser-Werke in Berlin-Borsigwalde, and Steyr-Daimler-Puch AG in Steyr/Oberdonau. Most of these had previously been making the MG.34; indeed, as more than one commentator has noted, considerable generic similarity is evident between the guns if Grüner is considered to have simply translated the older breech-lock into a single plane.

Though there are few important variants of the MG.42, many changes were made during the war to simplify production. The butt, which had originally been wood, became a synthetic injection moulding; the bipod was greatly simplified; the original straight charging handle was replaced with a toggle-grip lever to ease the cocking effort; and the dimensions of the barrel/barrel bush assembly were so substantially changed that interchangeability could not be guaranteed.

Usually mounted on its simple bipod, the MG.42 could be transferred to sophisticated-but-complex buffered quadrupod mounts – the MG-Lafette 42 and 43 – utilizing the standard MGZ.34 or MGZ.40 optical sights. Mount-types multiplied as the war progressed: not only could the MG.42 be adapted to fit the standard MG.34 tripods (Dreifuss 34 and 40) but there were also several differing pedestal, vehicle and anti-aircraft mounts by 1945.

When the first MG.42 were captured by the Western Allies, ordnance experts were amazed. The US Army, indeed, attempted to have two 'T24' MG.42-type guns made by Harrington & Richardson for detailed evaluation. Ironically, these guns would fire only a single shot and then jam – quite unlike the reliable feed of their German prototypes. Only when it was realized that no allowance had been made for the longer case of the standard

American .30 rifle cartridge was the problem revealed: the T24 simply did not recoil far enough to feed the second round into the action! Other than this exception to the general efficiency of the MG.42, which still serves the Federal German army (as the MG42/59 and MG3), few basic problems were encountered. Original pre-1945 guns will still be encountered in South America, with African guerrillas, and sometimes also in the Far East. A few guns fired before the rollers had properly locked – probably as a result of excessive wear or poor wartime construction – but an auxiliary bolt-catch was added to delay movement of the firing-pin support block and ensure proper roller engagement. Only a few guns were so fitted, however, and some manufacturers were still making first-pattern guns in May 1945.

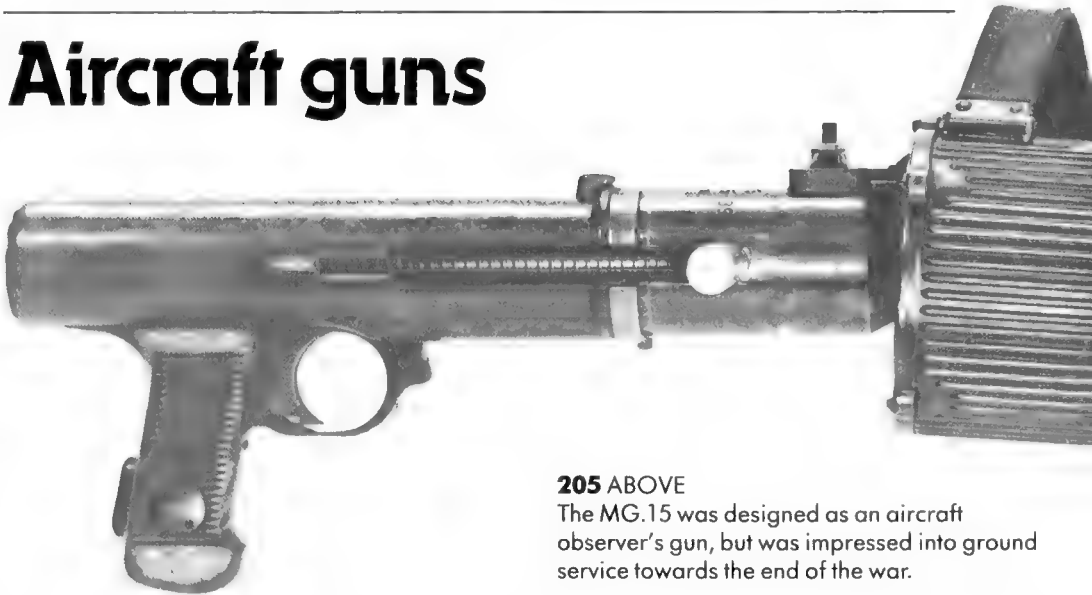
In service, the MG.42 was found to be wasteful of ammunition: individual examples had cyclic rates as high as 1,500rpm. The buffered MG-Lafette 42 was unstable during prolonged automatic fire and often had to be weighted with sandbags to prevent excessive shot dispersal. A strengthened 'MG-Lafette 43'

was still under development when the war ended.

Though the MG.42 was still being made in 1945, the German authorities, never satisfied, were experimenting seriously with the so-called MG.42V (or 'MG45'). Apparently being developed by Mauser at Oberndorf, this resembled the standard gun except for its delayed-blowback breech – the forerunner, in fact, of today's Heckler & Koch patterns. The first MG.42V, with a distinctive half-length barrel shroud, dated from June 1944. Five similar weapons followed immediately, and modified development patterns appeared towards the end of the year. Total production is unlikely to have exceeded ten.

The MG.45 weighed a little less than 9kg, fired the standard metal-link belt and offered a remarkable cyclic rate of 1,800rpm that would have made it impossible to control satisfactorily on a bipod. One gun allegedly fired 120,000 specially manufactured steel-case cartridges with practically no trouble, a testimony to the effectuality of the basic design and the care with which the ammunition had been prepared.

## Aircraft guns



### 205 ABOVE

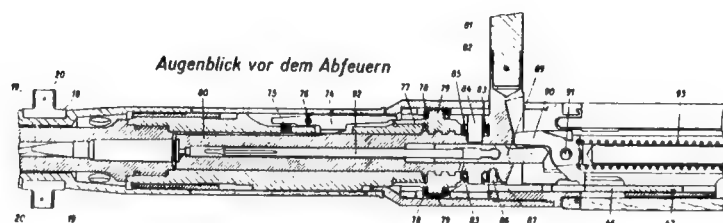
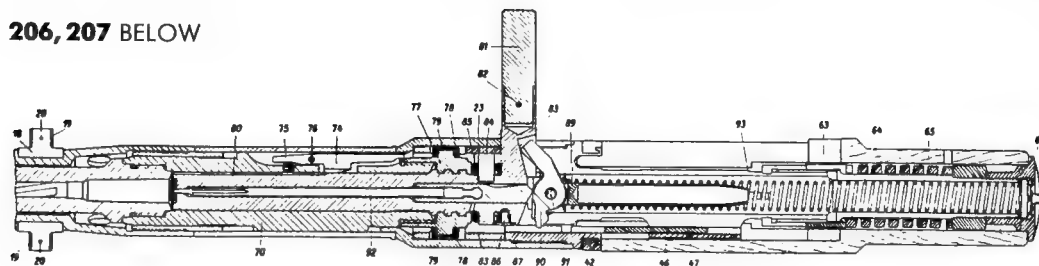
The MG.15 was designed as an aircraft observer's gun, but was impressed into ground service towards the end of the war.

As the war ran its course, supplies of conventional ground machine-guns ran too short to arm the Volkssturm and other last-ditch units formed to defend the Fatherland. One expedient was to convert many surviving aircraft machine guns to ground roles, the most favoured being rifle-calibre observers' guns. The addition of simple bipods and rudimentary stocks soon provided many

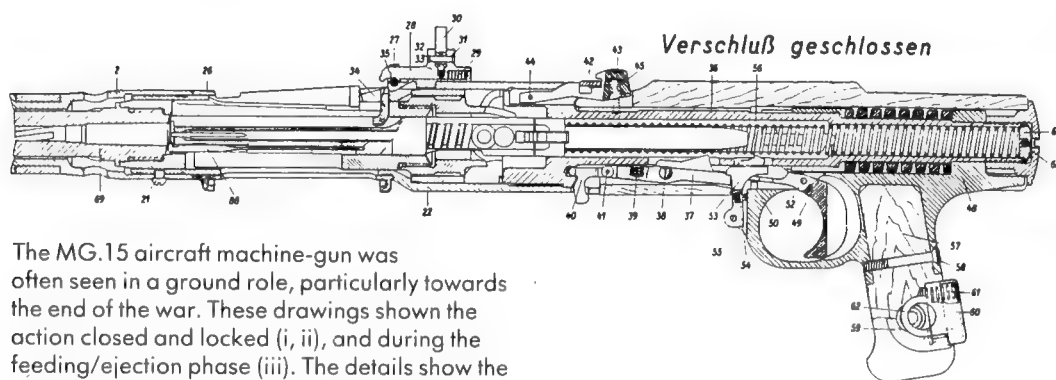
serviceable designs, lacking only the replaceable barrels of the best land-service guns. Though these conversions were generally incapable of prolonged sustained fire, they did provide effectual automatic weapons for troops who would otherwise have had none.

As rifle-calibre guns had become increasingly ineffective against aircraft from 1941 onward, presaging a move to

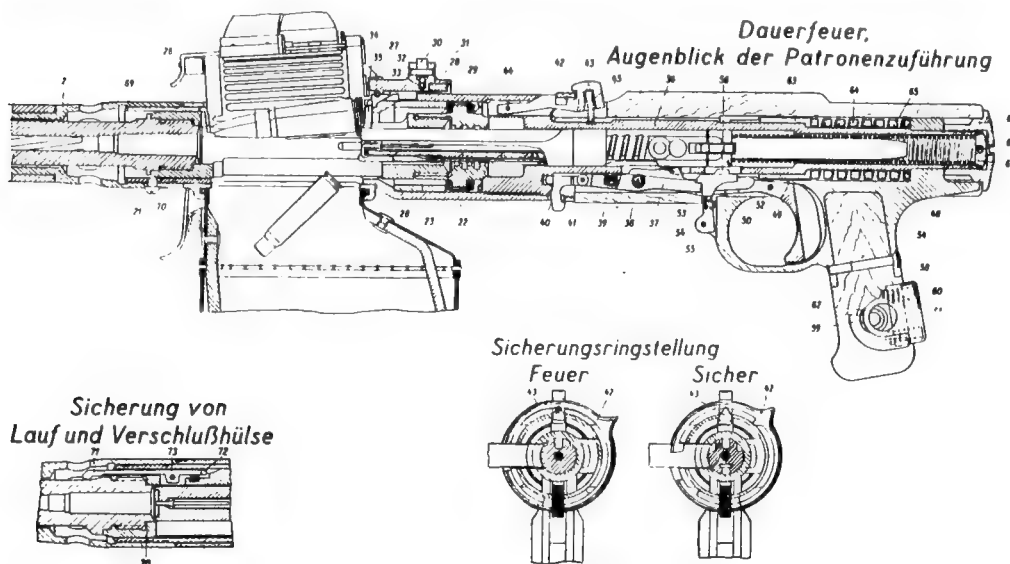
206, 207 BELOW



M.G. 15.



The MG.15 aircraft machine-gun was often seen in a ground role, particularly towards the end of the war. These drawings show the action closed and locked (i, ii), and during the feeding/ejection phase (iii). The details show the construction of the ejector (iv), the safety interlock between the barrel and the bolt (v), and the operation of the safety ring (vi).



the 15mm MG.151 and then to 20mm cannon, it is suspected that the earliest conversions were made about 1943 for Luftwaffe ground-defence forces. By the end of the war, however, many other combinations had been tried.

## RHEINMETALL DESIGNS

The principal aircraft guns of the mid 1930s had been the Maschinengewehr 15 and Maschinengewehr 17, intended for flexible and fixed mounts respectively. Developed from the Solothurn S2-200 land-service gun, they were designated T6-200 or S6-200 by their manufacturer. They had Stange-pattern breech arrangements and locking systems; the MG.15 (T6-200) also had a wooden butt/spring tube that supported the trigger unit. Capable only of automatic fire at up to 1,200rpm, the MG.15 was usually encountered with anti-aircraft ring sights, a ball mount and an integral canvas bag to receive ejected cases. The saddle-pattern magazine held 150 rounds, feeding alternately from its two drums. The MG.15 needed a suitable bipod for the ground role, though some were adapted for the Norwegian m/29 Browning tripod. The

official Luftwaffe adaptations were created from a kit comprising a properly-made bipod, a new mainspring-tube and an extension butt.

The belt-fed MG.17 (S6-200), intended for fixed installations, could be adapted to improvised tripod mounts. The 13mm-calibre Maschinengewehr 131 was rarely encountered on ground mounts as it relied on electric ignition. However, one or two instances have been reported of MG.131 emplaced in static defences where electrical supply was assured. These generally prove to have been observers' guns, with pistol grips and special cocking handles. Fed from the Gurt 131, the MG.131 embodied a modified Stange lock and an accelerator.

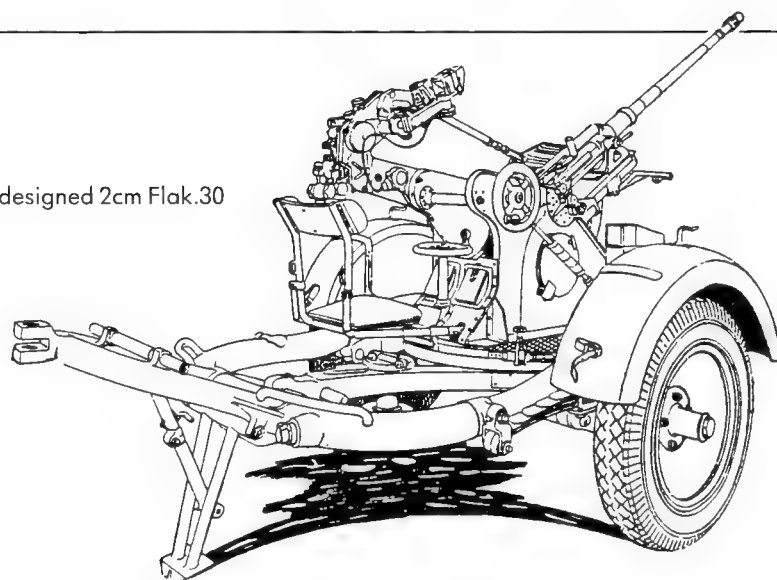
## MAUSER DESIGNS

Though the MG.15 and MG.17 were ordered into full production, proving effectual enough to fulfil immediate needs, the Luftwaffe was satisfied by neither the double-drum magazine nor the comparatively low volume of fire. Though the army offered participation in development of a genuinely universal machine-gun, the finalized MG.34 had too low a cyclic rate for aerial use. The Oberkommando der Luftwaffe asked Mauser-Werke, still smarting from the army's rejection of the 'MG.32', to develop an improved aircraft gun. Adopted in 1936, the Maschinengewehr 81 (MG.81) shared the basic locking system and several other features with the MG.34, although shorter, lighter and cheaper. The earliest guns had a 60cm barrel similar to that of the MG.15, but this gave so much drag in the slipstream that the observer was unable to train the gun effectively: aircraft speeds had considerably increased since 1930. The barrels were shortened to about 475mm after 1938, increasing the fire-rate and paradoxically improving accuracy.

The MG.81 shared a selectively distintegrating-link Gürt 17/81 with the MG.17. By using a special plier-like tool, the belt could be converted to non-distintegrating form, or to ensure that it parted only in short link-sections. The recoil-operated MG.81 had a cyclic rate of about 1,600rpm, which could be increased to nearly 3,000 by pairing otherwise identical left- and right-feed guns. Actuated by a single central pistol-grip unit, the MG.81Z (Zwilling, 'twin') ejected spent cases into the space between the two receivers, whence they passed into chutes that curved up and over the receivers and were eventually expelled on the side of the gun from which they had been fed into the breech.

The MG.81 soon proved to be very effectual, especially the compact 'Z' model. It was issued to the Kriegsmarine for short-range anti-aircraft defence – for which its lightweight barrel was hardly suitable – and, late in the war, on rudimentary bipods for field service. Ground guns usually exhibit simple butts extending rearward from the pistol grip.

**208 RIGHT**  
The Rheinmetall-designed 2cm Flak.30



MG.81 were originally made only in the Mauser factory in Oberndorf; however, demand escalated until four other major contractors participated – L.O. Dietrich of Altenburg, Heinrich Krieghoff of Suhl, I.C. Wagner of Mühlhausen, and Norddeutsche Maschinenfabrik of Wittenberge.

The 15mm MG.151 was another recoil operated Mauser design, locked by a rotating bolt. Capable of firing 750rpm from the selectively distintegrating Gürt 151, the MG.151 feed mechanism used a pinion on the return-spring tube in the receiver cover to engage a rack on top of the feed slide; the tube reciprocated dur-

ing the firing cycle, presenting the next round to the breech. By exchanging tubes and a few minor parts in the mechanism, the feed direction could be reversed.

Most versions of the MG.151 fired percussion-ignition ammunition, though the MG.151E was electrically primed. Toward the end of the war, when many had been displaced by the MG.151/20 – a 2cm-calibre enlargement of the basic design firing more powerful ammunition – a few 15mm-calibre machine-guns were adapted for rudimentary tubular steel wheeled carriages, apparently for the Volkssturm in Thüringen. Others were impressed as anti-aircraft weapons.

## Captured guns

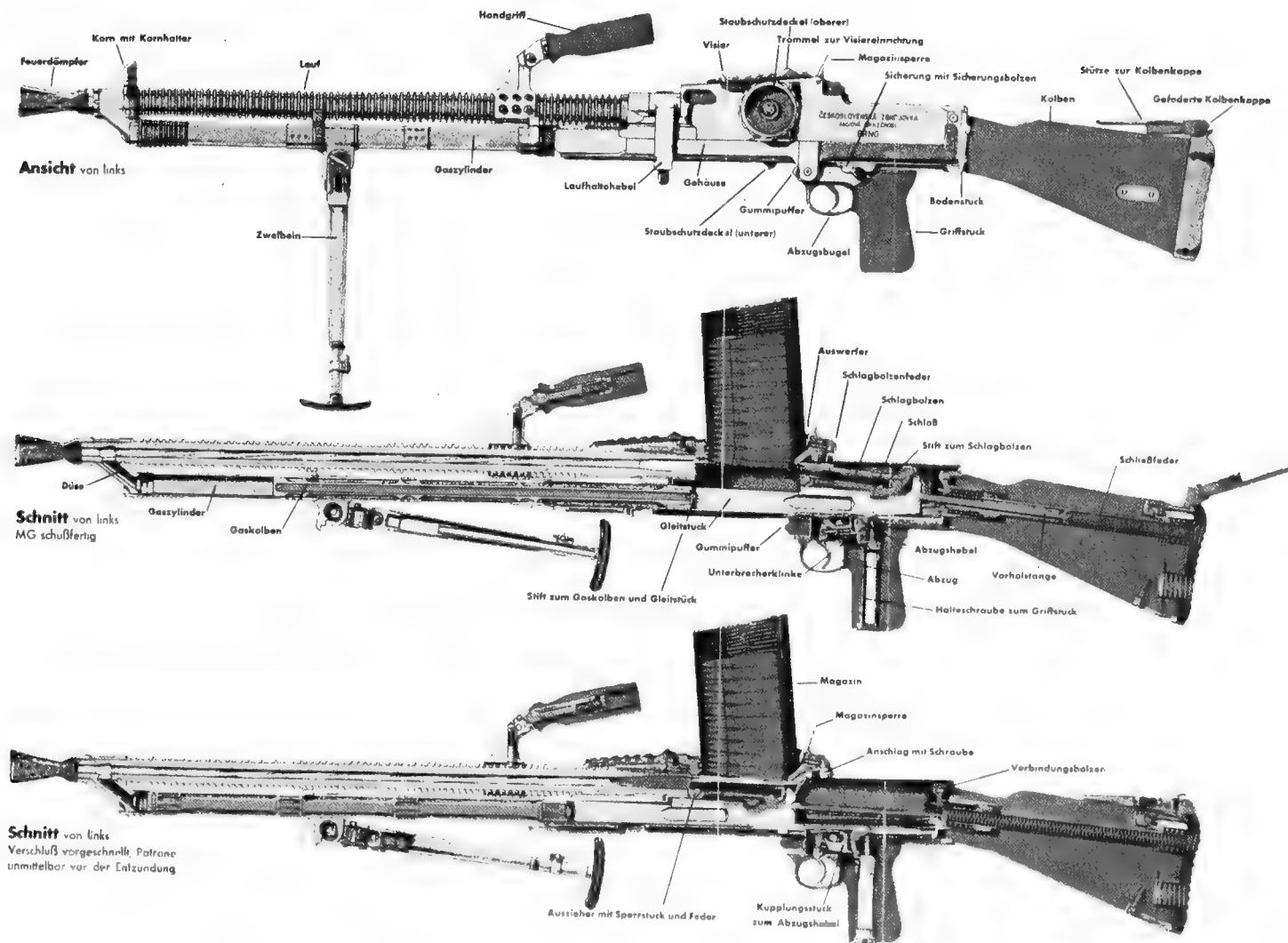


**210 ABOVE**

The Czechoslovakian vz.26 and vz.30 light machine-guns, ancestors of the British Bren Gun, were popular with the police, the Fallschirmjäger and the Waffen-SS. Fed from box magazines

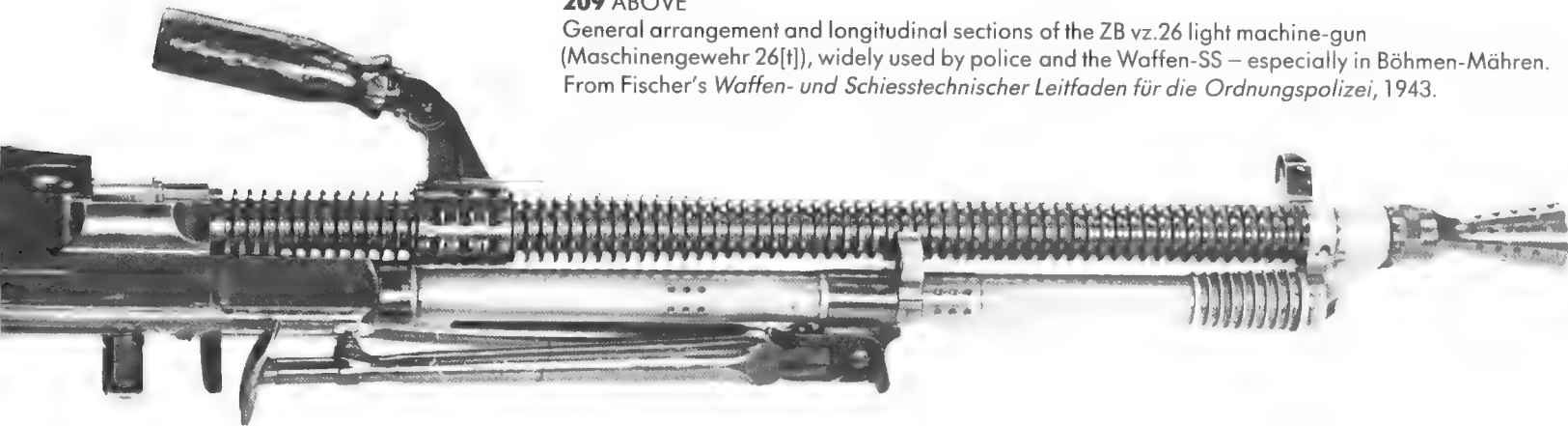
(which this gun lacks), but with easily exchangeable barrels, they proved ideal in highly mobile warfare. *By courtesy of The Pattern Room, Enfield Lock.*

# MG 26<sup>(1)</sup>



## 209 ABOVE

General arrangement and longitudinal sections of the ZB vz.26 light machine-gun (Maschinengewehr 26[t]), widely used by police and the Waffen-SS – especially in Böhmen-Mähren. From Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.



As the Wehrmacht rampaged across Europe, large quantities of machine-guns were captured or confiscated once opposing armies had capitulated.

The seizure of Austria in 1938, for example, was accompanied by the assimilation of the Austrian army and its weaponry into the Wehrmacht. The standard heavy machine-gun was the Schwarzlose

M 07/12, a pre-First World War German design re-chambered for the 8×56mm rimmed cartridge in the 1920s. There were also substantial numbers of the light M30 (Solothurn S2-200) pattern. However, the Austrian army was not particularly large; most of the men inducted into the Wehrmacht immediately re-armed with standard German guns, and the Austrian

guns passed to the police or into store.

Czechoslovakia had made machine-guns not only for indigenous troops but also for export. Large numbers of them, therefore, were in store or awaiting despatch when the Germans invaded.

After an uncertain start, the eminent designer Václav Holec – assisted by his brother Emanuel – had produced the re-

**211 BELOW**

The Czechoslovakian ZB53 medium machine-gun was used by the Waffen-SS, police and some army units during the Second World War.

*Courtesy of Weller & Dufty.*

**212 RIGHT**

Members of the Waffen-SS demonstrate the Maschinengewehr 30(t), the ex-Czechoslovakian ZB vz.30. *By courtesy of the Bundesarchiv; negative no. 48/111/37a.*



coil-operated Praga I-23 light machine-gun, locked by a vertically tipping breech-bolt. The belt-fed Praga proved effectual, but clearly needed refinement. The Ruční Kulomet 'Praga' vz.24 (Praga light machine-gun, model 1924) subsequently amalgamated a top-mounted box magazine with the basic I-23 action. Its mainspring ran back through the butt, and a specially sprung butt-plate was intended to absorb some of the recoil forces generated during prolonged firing. By the time the prototypes had been per-

fectured, a shoulder-support had been added to the butt, a drum sight had replaced the previous leaf, and the barrel had been partially finned to improve cooling. Successful tests against a Hotchkiss and a lightened Schwarzlose allowed the vz.24 to be approved as the 'lehký kulomet ZB vz.26' in the summer of 1927. The first production guns appeared in 1928-9 and it soon became clear that the vz.26 was very efficient; by 1938, guns had been exported to Yugoslavia, Latvia, China, Ecuador, Iran, Siam and Brazil.

Later in the war, the Wehrmacht was to retrieve many of the Yugoslavian and Latvian guns for German service.

By the mid 1930s, the vz.26 had been joined by the ZB vz.30 – developed for Romania – and the ZGB vz.33. The Romanians had indicated a willingness to make the basic ZB machine-gun under licence, but had requested some minor changes. The resulting vz.30 was manufactured by Zbrojovka Brno in Czechoslovakia and CMC at Cugir in Romania. Externally similar to the ZB vz.26, the



vz.30 had a differing seven-position adjustable gas-port assembly and markedly different bolt/piston extension construction. It had been exported to Afghanistan, Ecuador, Ethiopia, Bolivia, Peru, Uruguay and Turkey by the time the Germans seized the factory. The Yugoslavian Model 37 (ZB vz.30J) was made under license by the government manufactory at Kragujevac, principally for the Yugoslav army but also for limited export.

Brno also made the ZGB sub-variant commercially, selling it to several countries. The ZGB vz.33 was the last of a series of guns offered to the British in the early 1930s as a replacement for the Lewis Gun.

The ZGB was a variant of the vz.30, eventually being refined by the substitution of a plain-surface barrel and adopted for British service as the 'Bren'. While production lines were being readied in the smallarms factory at Enfield, however, Zbrojovka Brno also made Bren-type guns for commercial sale.

The box-magazine ZBs were generally considered as light machine-guns, though attempts were made to adapt them for support fire. Though several impressive-looking tripod and quadropod mounts were offered, and despite a readily exchangeable barrel, limitations imposed by the box magazine limited the volume of fire the ZB could produce.

When the Germans invaded Czechoslovakia, they seized existing ZB guns – vz.26, vz.30, vz.30J, ZGB/Bren – and immediately reissued them to the Wehrmacht. Modifications were unnecessary as they already chambered the standard German 7.9mm service cartridge. ZB machine-guns were well made, very accurate, and their box magazines were easier to handle than the belt-feed or saddle-drums associated with the MG.13 and MG.34; tactically handier than either German gun, ZBs were greatly favoured by Fallschirmjäger, police and paramilitary units such as the SS, whose procurement was normally subordinated to army

needs. The guns were known as Maschinengewehre 26(t) and 30(t) in German service, the small number of Bren-type weapons apparently being considered as '30(t)'. Production continued for some years after the German invasion, though greatly reduced after a decision to concentrate on the MG.34 had been taken in the summer of 1940.

The standard Czech heavy machine-gun had originally been the ex-Austrian Schwarzlose, small quantities of the 07/12 model being converted to 'vz.07/24' standards (and the 7.9mm cartridge) by the Janaček factory in 1924-5. These were produced for several years, permitting a small export market to be created, but were clearly antiquated. As the Schwarzlose blowback system was only marginally strong enough for the 7.9mm cartridge, attempts were made to transform the Holec Praga I-23 design into a suitable heavy machine-gun. The first stage was the ZB-50, developed by Václav Holec and Miroslav Ročík, which pro-



213, 214 ABOVE AND BELOW

Among the thousands of Russian machine-guns captured by the Wehrmacht were the heavy water-cooled Maxim PM 1910, alias s MG.216(r), and the pan magazine-fed Degtyarev DP (le MG.120[r]). Both chambered the awkward 7.62mm rimmed rifle cartridge, but were reliable under Russian conditions.

By courtesy of The Pattern Room, Enfield Lock.





gressed to the ZB-52 and ZB-53. The ZB-53 was perfected in 1934 and adopted tentatively as the 'těžký kulomet vz.35' and then finalized as the 'vz.37' once field trials had suggested some minor modifications. Zbrojovka Brno made both types concurrently, rapidly establishing an impressive export market and – indeed – persuading the British to adopt the ZB-53 as the 'Besa'.

The Germans also seized quantities of the vz.35 and vz.37, production continuing for some time under HWaA supervision. The guns were known as Maschinengewehre 37(t); some were issued to the Wehrmacht, particularly when production of the MG.34 was lagging and the MG.42 had yet to appear. By 1944, most had found their way into the hands of the police forces to supplement ageing Maxims. They were generally issued with Czech-made ZB-308 tripods, but may sometimes be encountered adapted for standard German mounts.

The vanquished Polish army was unable to contribute much in the way of an efficient machine-gun to Wehrmacht stocks – excepting refurbished MG.08 Maxims, most of which were old German guns given to emergent Poland as war reparations in 1920-1. There were substantial numbers of Browning automatic

rifles, a variation of which had been made under licence.

Few of the other countries overrun in 1939-40 provided much in the way of war matériel. Denmark and Norway provided a few Madsens and Maxims respectively, together with a number of Browning automatic rifles. Belgium provided Mle 30 Browning automatic rifles (le MG.127[b]), made under licence by Fabrique Nationale d'Armes de Guerre in Herstal, and Browning aircraft guns made by FN and Fabrique d'Armes de l'État in Liège. The Netherlands contributed the M20 Lewis Gun, known to the Germans as the le MG.100(h). French Vichy forces retained most of the quirky French machine-gun designs apart from those that armed captured tanks, and most of the Mle.24/29 'Châtellerault' light machine-guns, the external appearance of which was redolent of the ZB/Bren series. Mle.31 Mitrailleuses de Fortresse, with extraordinary side-mounted drum magazines, were emplaced on the Atlantic Wall. German police manuals suggest that small numbers of the Chauchat or CSRG machine rifle – le MG.156(f) – were also issued in small numbers, but the case is not conclusively proven.

The opening stages of Operation 'Barbarossa', the invasion of Russia, provided

## 215 ABOVE

An MG.42 in Italian service, probably taken during the long slow retreat northward in 1944. Note the PzKw.VI 'Tiger' tank.

*By courtesy of Ian Hogg.*

huge quantities of Russian machine-guns – principally the water-cooled obr.1910 Maxims and the pan-feed Degtyarev 'DP' or obr.1929g. These were known to the Wehrmacht as s MG.216(r) and le MG.120(r) respectively. Some examples of the abortive 7.62mm DS medium machine-gun of 1939 (s MG.218[r]) were also seized, together with heavy 12.7mm DShK. The belt fed DS played no part in the HWaA's schemes; the few specimens being given to the police, though at least some of the sturdy and acceptably reliable DShK were reissued to the German troops fighting on the Russian Front.

Towards the end of the war, even though the Russians were on the ascendant, the Germans began to capture 7.62mm Russian SG43 or Goryunov medium machine-guns, an efficient gas-operated design with a laterally-locking breechblock. These were popular and efficient, but never available in large numbers.

# SEVEN

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## THE SUPPORT WEAPONS

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Anti-tank rifles, rocket guns, bazookas, infantry guns, and even ideas from the lunatic fringe of weapons design.



# Support weapons

## ANTI-TANK RIFLES

The appearance of the first British tanks in combat on the Western Front (15 September 1916), and the subsequent massed use of them, caused great panic among inexperienced German defenders. Though the land-ships were impossibly clumsy and unreliable, they had considerable offensive capability; initially, they seemed invulnerable to anything less than an artillery shell. However, the Germans had an effectual 7.9mm armour-piercing bullet, which, developed for aerial use, had proved itself against metal vision-slit protectors and was widely issued for land service. These projectiles could pierce the 10mm armour of the earliest tanks, but only if they struck perpendicularly ('normal') to the plate surfaces; an angular strike usually caused a ricochet, though it sometimes detached fragments of the inner surface of the armour plate to discomfort the tank crew.

The GPK soon realised that greater penetrative power was needed, but also that no existing gun could be adapted to the task. Consequently, the authorities set about developing two projects concurrently: a large-calibre rifle, for immediate issue to the infantry, and a machine-gun for land and aerial use. Towards the end of November 1917, the GPK had instructed Waffenfabrik Mauser to develop a manually operated anti-tank rifle even though the cartridge had not been agreed. Owing to the urgency of the situation – the priority was identical with the submarine-building programme – the cartridge had been tested and the prototype gun delivered to the GPK by mid-January 1918. By the end of the war, about 15,800 Elefantbüchsen ('Elephant Guns') had been made. They were known as 'T-Gewehre' or, later, 'T.u.F.-Gewehre'.

Measuring about 1.7m overall, with an 87cm four-groove barrel rifled with a clockwise twist, the T-Gewehr weighed about 17.8kg with its MG.08/15-type bipod. Though it had a modified Mauser bolt action, similar to that of the Gew.98, the standard gun was a single-loader. Mauser did make a handful of improved rifles, with a five-round box magazine beneath the stock ahead of the trigger and a sprung butt-plate, but none had been issued by November 1918.

The 13mm cartridge measured about 133mm overall and weighed about 116gm laden; its 63mm steel-cored bullet contributed 51.5gm, while the charge of flake nitrocellulose provided 13gm. Muzzle velocity was about 780m/sec, resulting in an impressive penetrative capability for its day. Allied representatives were mortified to discover at a test-firing that the T-Gewehr bullet went straight through a 28mm-thick 'bullet proof' plate placed at a distance of fifty metres.

Shortly before the war ended, the Germans had introduced a heavier bullet in which the entire core-surface had been hardened; the core-tips of the earlier lightweight bullets had shown a tendency to snap off when striking obliquely, considerably reducing the T-Gewehr's effectiveness.

The rifles were unwieldy and universally disliked on account of their ferocious recoil. After the end of the First World War, however, they excited much interest. By the mid 1930s, indeed, few countries had improved greatly on the T-Gewehr and its 13mm cartridge, which had inspired the development of both the .5 Browning cartridge in the USA and the 0.55 belted Boys anti-tank rifle pattern in Britain. Various attempts had been made to accelerate rifle-calibre projectiles to prodigious speeds – notably by Gerlich in Germany and Janaček in Czechoslovakia – but these had been achieved by tapering the entire bore or adding a

## 216 RIGHT 217 BELOW RIGHT

The original German anti-tank rifle was the Mauser 'T-Gewehr' of 1918 (top), which fired a 13mm-calibre bullet from an greatly enlarged 7.9mm-pattern cartridge case. The T-Gewehr, very effective during the First World War, had been rapidly overcome as the thickness of tank armour increased in the 1920s. The Germans subsequently introduced the PzB.38 and then the simpler PzB.39 (bottom), but neither was effectual enough to remain in production. *By courtesy of The Pattern Room, Enfield Lock and Ian Hogg.*

'squeeze muzzle'. Additional penalties included excessive barrel wear and the expense of tungsten-cored shot.

Rifle-calibre ammunition, which had no great capacity for explosive payload, was doomed to failure; 2cm cannon such as the Becker, tested by the Germans during the First World War and later to be developed into the Oerlikon, held much greater promise.

When the campaigns in Poland began, the standard German anti-tank rifle was the 7.9mm Panzerbüchse 38 (PzB.38). Designed by Dipl.-Ing. Bauer of the Heereswaffenamt – though often now credited to Rheinmetall – most surviving examples seen to have been made by Havelwerk ('cpj') or Gustloff-Werke ('dfb'). The PzB.38 is an interesting single-shot auto-ejector with a wedge-pattern breechblock sliding vertically in the breech. When the gun fired, the barrel, receiver and breech ran back together in the stock; at the end of the stroke, the recoil spring pushed the components back to their initial position, but cammed open the breechblock to eject the spent case. The firer then inserted a new cartridge manually, tripping the breech latch and allowing the action to close automatically.

The standard cartridge was the Patr.318 – an '8mm' bullet inserted in a 13mm case, the designation being the numbers reversed. This fired a 7.9mm projectile at more than 1,200m/sec, but



30mm armour penetration at 200m was no great improvement on the T-Gewehr. Despite the inclusion of a lachrymatory capsule in the original cartridge, this capability was only discovered by examining captured ammunition.

The PzB.38 was tested in Poland and found wanting; it was cumbersome, though a little lighter than the T-Gewehr, and the semi-automatic breech system was none too reliable in adverse conditions. Dipl.-Ing. Bauer then produced the simplified PzB.39. Though externally similar to its predecessor (though notably slimmer), it had a simple drop-ping-breech action operated by unlatching and pushing down on the pistol-grip/trigger assembly. The new rifle weighed a mere 12.4kg which, with the omission of the recoil-absorbing springs, gave it a far heavier recoil than the PzB.38. Tested in the opening stages of the Second World War, the PzB.38 also proved a failure: not because it was any less effectual than the PzB.38, but simply







218 ABOVE

The Czechs had experimented with several differing rifles prior to the German invasion. However, none was accepted for service until the advent of the two Brno-made vz.41 variants, the 7.9mm ZK407 and 15mm ZK416. Most of the former were used by the Waffen-SS: note the mark 'M.SS 41' on this example, no.1603, captured by the US Army and photographed at Aberdeen Proving Ground on 30 December 1944. *By courtesy of Ian Hogg.*

because increasing tank-armour thickness was defeating all rifle-calibre weapons.

The Germans turned to the Gerlich-system schwere Panzerbüchse 41 (s PzB.41), which squeezed a 28mm-diameter projectile to emerge as 21mm calibre at the muzzle, but shortages of tungsten soon forced the abandonment of the s PzB.41.

By the opening stages of Operation 'Barbarossa', therefore, the small-calibre German anti-tank rifles had been all but discarded; captured Russian weapons, particularly the simple 14.5mm PTRD, were to prove much more useful. But something had to be done with the thousands of PzB.39 that had been made by Havelwerk, Gustloff-Werke and others. Apart from anti-tank rifles serving in less taxing theatres, such as North Africa and the Balkans, most survivors were subsequently converted to Granatbüchsen 39 (GrB.39) by removing the fore-end, shortening the barrel and affixing a grenade discharger cup. The GrB.39 was much shorter and appreciably lighter than the PzB.39. By the end of the war, it, too, was very rarely seen.

The continual struggle for tank-versus-gun supremacy, which had soon reduced the standard German anti-tank rifles to impotence, forced a search for more useful weapons. Apart from conventional anti-tank artillery, whose calibre progressed upward from 3.7cm to 12.8cm by the war's end (for details, see Ian Hogg's book *German Artillery of World War Two*, Arms & Armour Press, 1975), it was vital

to find a suitable weapon for infantry support. Small numbers of wz/35 hyper-velocity rifle-calibre guns had been seized in Poland, but they offered little advance on the German Panzerbüchsen and required tungsten-cored ammunition. A more effectual solution was the 2cm Solothurn S18/1000, known in German service as the Panzerbüchse 41 (PzB.41). This was a powerful recoil-operated semi-automatic cannon, offering acceptable power, penetrative capability (30mm at 250m) and offensive payload in its large-calibre shell. However, the S18 was long and very heavy (2.1m overall, 44kg). It was also very complicated, incorporating a Stange collar-lock, five- or ten-round box magazines and a cocking system in which a crank and a toothed chain were needed to overcome the strength of the recoil springs. The PzB.41 also proved ineffectual against the frontal armour of the Russian T-34 tank, survivors being sent to North Africa and Italy later in the war.

As the HWaA moved away from rifle calibres to other and better ideas, the Waffen-SS also began to seek effectual anti-tank weapons. None was available through regular channels in 1940-1. Shortly before the Germans had overrun Czechoslovakia, however, work on small-calibre anti-tank rifles had commenced. After rejecting a handful of prototypes, including several Janaček squeezebores, the Czechs were left with several Zbrojovka Brno developments – ZK 395 (12mm and 15mm) and the ZK 405-407 series (7.9mm, some manually operated and others semi-automatic). Marketed as the 'Protitanková puška vz.41', a few large-calibre guns went to Italy while the SS took appreciable numbers of the smaller, which were generally known as 'M.SS-41' in German paramilitary service.

The SS-41 had very little to commend it as the complexity of the action, despite being beautifully made, was unsuited to arduous service. After the gun had been

fired, the pistol grip was rotated laterally to the right to unlock the breech and pushed forward. This pulled the breech-sleeve away from the standing breech to expose the spent cartridge case. At the end of the opening stroke, the ejector kicked the case clear of the gun, whereafter retracting the pistol grip and sleeve assembly reloaded the action from a detachable ten-round box magazine. Turning the grip back to its original vertical position then secured the system ready for the next shot. The SS-41 was about 1.2m long and weighed 18kg unladen. Muzzle velocity was about 1,220m/sec, which gave a penetrative capability similar to that of the PzB.38 and PzB.39...which were already obsolescent in the Wehrmacht.

## ROCKETS AND BAZOOKAS

The rapid failure of conventional PzB.38 and PzB.39, and the withdrawal of the s PzB.41 and its tungsten-cored shot, soon deprived German infantrymen of lightweight anti-tank weapons.

Need became desperation when the Russians began to introduce far better tanks, such as T-34/85 and KV-1, which



were difficult to defeat by conventional infantry means. Anti-tank measures were soon helped considerably by the rediscovery of the Monroe Effect, originally used in railway construction, in which a cone-shape liner and a comparatively small charge of high explosive could pierce incredible thicknesses of steel-plate. Most other forms of specialised projectile were immediately rendered obsolescent.

However, though hollow-charge ammunition could be provided for guns above 7.5cm calibre without exceeding bore diameter – and simply fired from the breech – small-calibre guns were far less suitable. Though an attempt was made to improve the performance of the 3.7cm Pak.36 and 5cm Pak.38 by issuing finned Steilgranate 41 and 42, with tail-rods protruding down the bore, low velocity limited engagement range.

To their credit, Steilgranaten could penetrate as much as 18cm armour and threatened even the best Russian tanks. Unfortunately, the Pak.38 weighed nearly a tonne in action and was scarcely ideal for 'shoot and run' engagements necessitated by short-range projectiles. Consequently, Steilgranaten were little more than last-ditch weapons to be used when the gun was seriously threatened. By 1943, lighter and more mobile solutions were vital.

Though recoilless guns promised an effectual combination of light weight and power, they had also proved extremely wasteful of propellant in relation to power. In addition, excessive back-blast from the venturi-type breech instantly revealed the gun's position to the enemy after each shot. These guns would not be the answer to the anti-tank problem excepting a copy of the US 2.36 M1 Bazooka, the 8.8cm Raketenpanzerbüchse 54 (RPzB.54), which was not officially adopted until 12 August 1944. Though the RPzB.54 still suffered excessive back-blast, it weighed less than 11kg and was easily moved to a new site after each shot. Issued widely to the Panzer-



#### 219 LEFT

To extend the performance of the obsolescent 3.7cm Pak.36, a distinctive hollow-charge stick-bomb (Stielgranate 41) was developed. A rod inside the hollow tail-fin unit slipped down the muzzle, allowing the bomb to be fired with a separate blank cartridge. Though effective range was comparatively short – only about 300m – the projectile could penetrate 18cm of armour plate. *By courtesy of Ian Hogg.*

zerstörer-Bataillone and the Panzer-Grenadiers by the end of the Second World War, the German Bazooka was made in two versions: RPzB.54 of August 1944, with a bar igniter, and the later RPzB.54/1 of 20 December 1944 embodying a ring-contact system.

One alternative to the RPzB.54 was Püppchen ('little doll'), officially known as the Raketenwerfer 43 or RWr.43. Generally credited to Dipl.-Ing. Dr Erich Holt of Westfälisch-Anhaltische Sprengstoff AG, Püppchen was basically a closed-breech version of the RPzB.54 firing a similar fin-stabilised shell. Some of the merits of recoillessness were lost by

closing the breech, but the overall weight of Püppchen plus its firer, who sat on the simple box trail, was sufficient to eliminate movement. The weapon was comparatively light, but elevated or traversed manually and had a limited range. Published pictures show firers wearing goggles to guard against escape of gas at the breech.

The effective range of the RWr.43 and RPzB.54 was comparatively short, resulting in a demand for a mobile but light-weight weapon capable of consistently hitting one-metre square targets 750m away. As this was completely beyond any of the special weapons, excepting conventional artillery, a new solution was found in the so-called 'high/low pressure

system', credited to Rheinmetall-Borsig. The basic principle was not new, having been tried in a differing form in the Zalinski Dynamite Gun late in the nineteenth century. Though Zalinski, his predecessors and imitators had used the propellant to compress air through an intermediary piston, the goal was much the same: the smooth launch of a delicate



The 8.8cm Panzerschreck. The inset shows a captured weapon being tested by the US Army. By courtesy of Ian Hogg.

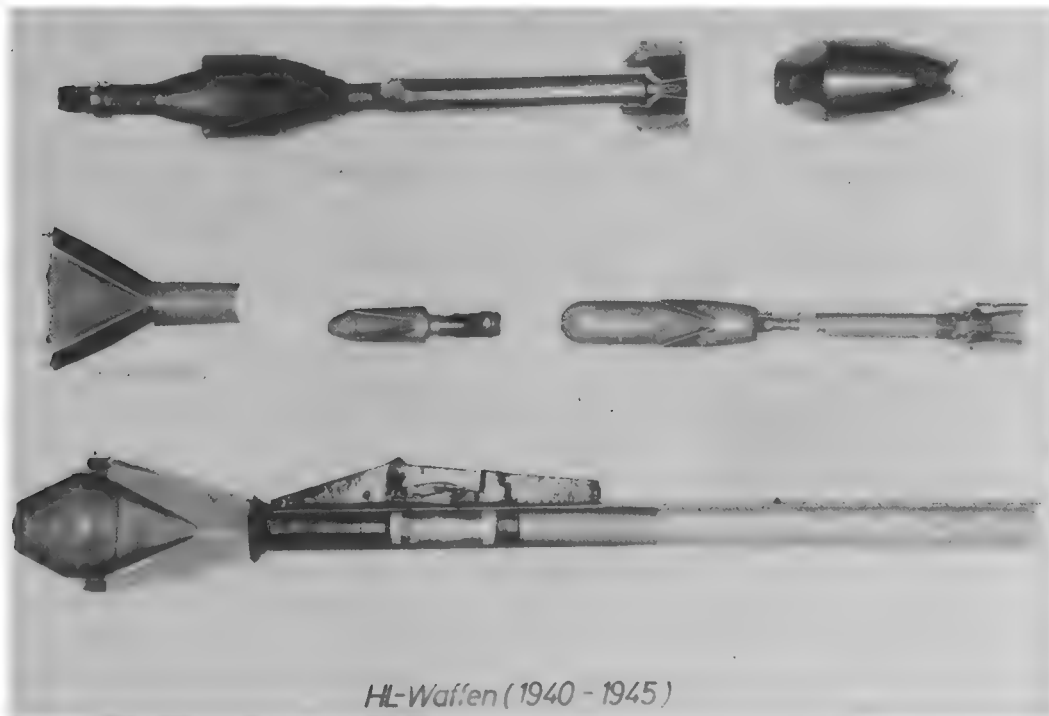
220 ABOVE

221 RIGHT

The single-shot throwaway Panzerfaust ('armoured fist') was designed by Dr Langweiler of Hugo Schneider AG (HASAG), Leipzig, in 1940-1. The perfected production pattern appeared in the summer of 1943. Comprising a large hollow-charge stick bomb loaded into a tube containing the propellant, Panzerfaust came with a crude sight and trigger system. At short range, it was exceptionally effective and could penetrate 14-20cm of armour plate. Disadvantages included a back-blast that gave a two-metre sheet of flame.

Several versions were made, beginning with the Panzerfaust 30 (two versions, with small- and large-head bombs), then progressing to Panzerfaust 60 and Panzerfaust 100. The figures indicated the recommended maximum engagement range, though the Panzerfaust 60 was sighted to 80m and the Panzerfaust 100 to 150m. Loaded weight varied between 3.1 and 6.8kg, depending on size, while overall length was 1.03m (models 30 and 60) or 1.15m (model 100). Manufacturers included the HASAG factories in Leipzig ('wa') and Schlieben ('wk'), Oerlikon Bührle & Co., and, apparently, Rheinische Gummi- & Celluloid-Fabrik of Mannheim ('dsu'). They were issued to the army and the Waffen-SS, and then to the Volksturm.





HL-Waffen (1940 - 1945)

projectile, laden with comparatively unstable explosive, without the expense of special propellant or undesirable premature explosions. The Zalinski Gun shell had a leisurely flight and restricted range, yet it did work. In the context of 1944-vintage anti-tank warfare, its advantages were perceived to be greater than the drawbacks.

Rheinmetall's Panzer-Abwehr-Werfer 600 (Paw.600), later rechristened Panzer-Abwehr-Kanone (Pak.) 8H63, was very light for its bore-size – even the perfected weapon weighed a mere 600kg in action. It fired the unique WGr.Patr.Hl.4462, comprising a modified

#### 222 ABOVE

A comparison between the rocket for the Panzerschreck (top) and the essentially similar bomb used in the Raketenwerfer 43 or 'Püppchen', distinguished by a small cartridge-case attached to the base.

#### 223 LEFT

A captured 8cm Raketenwerfer 43 ('Püppchen'), with its distinctive hollow-charge bomb. *Courtesy of Ian Hogg.*

#### 224 BELOW

A miscellany of hollow-charge ammunition, including the Panzerschreck ('German Bazooka'), a Japanese magnetic lunge-mine, the German Gewehrpanzergranate, the standard US 2.36in M1 Bazooka and the Panzerfaust. *By courtesy of Messerschmitt Bölkow Blohm GmbH.*

8cm mortar-bomb attached to a heavy iron plate over which the mouth of a standard 10.5cm le.FH 18 cartridge-case had been crimped. The Paw.600 was loaded and fired conventionally, but events thereafter were anything but conventional: gas bled through the venturi holes into the space between the mortar-bomb sealing rings and the base-plate, but at greatly reduced pressure compared with the confinement chamber (the shell case). A shear-pin connecting bomb-tail and base-plate ruptured once the pressure behind the bomb had increased to the correct level, whereupon the projectile flew forward out of the muzzle.

The smoothbore Paw.600 could defeat 14cm of armour plate even at its maximum effective engagement range of 750mm, while consuming only about 360gm of standard propellant. However, the perfection of the system coincided



## 152 SUPPORT WEAPONS

with declining German fortunes; only about 250 guns were made in the last four months of the Second World War.

### 225 RIGHT

The crew of a 3.7cm Pak.36 at practice. Note the two Kar.98k, SG.84/98 and entrenching tools, a carrier-strap for the gun-trail over the layer's shoulder, and a map case on the belt of the gun-crew commander (left, with binoculars). A photo-postcard from the 'Unsere Wehrmacht' series – 'Pak bei der Abwehr eines Angriffs' – published by Kunstverlag E.A. Schwedtfeger & Co. AG, Berlin, c.1938; *LPI archives*.

## INFANTRY-SUPPORT WEAPONS

Though anti-tank artillery was handled by specialists, even the German infantry were issued with several close-support guns whose hollow-charge shells provided a satisfactory defence against tanks. The most commonly encountered of these weapons in 1939 was the 7.5cm le IG.18, with a distinctive shotgun-style tipping-barrel breech and a weight of about 400kg in action. Designed in the immediate post-First World War period and made by Rheinmetall from 1927 until the end of the Second World War, it provided effectual support fire when required to do so. The standard high-explosive 7.5cm IGr.18 shell, indeed, could be fired to a maximum range of 3.38km.

Despite efforts to perfect an improved infantry-support gun, the Rheinmetall-designed IG L/13 of 1936, no replacements were forthcoming until 1944, when the 7.5cm IG.37 was improvised by mounting a new Krupp-designed gun (with a half-automatic vertically sliding breechblock) on redundant Pak.36 carriages. The IG.37 was heavier than the IG.18, weighing about 510kg in action, but could throw a shell to a distance of 5.15km. While IG.37s were being assembled, the IG.42 (neuer Art, new model) was created by mounting an IG.37-type gun on a slight modification of the Paw.600 carriage. However, only a few had been made by the end of the war.

The largest gun to be classed specifically as an infantry-support weapon was the *schweres Infanteriegeschütz 33* (15cm s IG.33), a howitzer that weighed







**226 LEFT**  
Panzerfaust. *By courtesy of Ian Hogg.*

1,700kg in action but could fire a 38kg high-explosive shell to a distance of 4.7km. Maximum elevation was 73°, which allowed projectiles to be lobbed over lofty obstacles. Designed by Rheinmetall in immediate post-1918 days, the gun entered production in 1927. Sturdy and reliable, it was successful enough to remain in service until 1945. Some guns, indeed, soldiered on into postwar years in the hands of lesser European powers.

In addition to regular high-explosive ammunition, the IG.33 could fire a large stick-bomb designated 15cm StGr.42. Intended to demolish strongpoints at a

maximum distance of a thousand metres, this 90kg projectile contained 27kg of amatol; it proved very useful not only against pill boxes, but also against barbed-wire obstructions and minefields, which it could clear by blast effect alone.

## THE LUNATIC FRINGE

To supplement conventional support weapons, German scientists dreamed up several extraordinary ideas. Among them were the Wirbelgeschütz ('vortex gun') and the sound cannon, both originating at an aerodynamic institute in Tirol. The

former made use of the well-known ability of slow-burning explosive to create vortices that would wrench aircraft apart – or so its designer hoped – but the problem of achieving sufficient height was never solved; the sound cannon featured a three-metre diameter parabolic mirror, amplifiers and a series of detonating chambers to produce a continuous high-pitched note that could kill small animals at short range. But neither could be called battle-worthy in any sense of the term; nor could the Häsler Electric Gun, in which a variation of the linear motor principle was supposed to launch a continuous stream of projectiles at London...but was found to need a colossal power station to do so.

The Cönders Tausendfußler ('millipede') was a long-barrelled multi-chamber gun designed to bombard London from a site at Mimoyèques, near Calais. Lateral chambers connected to the bore contained additional propellant charges fired a microsecond or two after the projectile passed, the goal being hyper-velocity. A full-size Cönders Gun was eventually made to work in a test installation on the island of Misdroy in the Baltic, but was never reliable. While the test-firing was underway, however, the Mimoyèques site was destroyed by the Royal Air Force. Two short-barrel guns were mounted on a railway trucks to support the Battle of the Bulge – the German counter-attack through the Ardennes in the winter of 1944/5 – but were destroyed by Allied action before achieving anything of note.

Most of the smallarms that reached service were relatively conventional. Small-calibre rocket or ramjet projectiles, briefly mentioned in the ammunition chapter, were never likely to succeed; indeed, neither were the full-size shells. Among the more optimistic ideas was the curved barrel, or Krummlauf device briefly reviewed in the rifles chapter.

This was conceived to protect tank and armoured vehicle crews whose firing ports had blind spots. Originally to be mounted in ball mounts, Krummläufe were developed for the Kar.98k in several differing guises. Considerable experimentation was necessary to find not only the ideal form for the barrel-attachment system, but also the radius of the barrel-curve and adjustment needed in the bore dimensions. Many of the earliest prototypes ruptured either on the first shot or after sufficient shots had been fired to weaken the outer side of the curve.

After the introduction of the MP.43, the Krummlauf was adapted to provide an urban infantry weapon that could shoot around corners without the firer exposing his head or body to enemy retaliation. A reflector sight was incorporated in the Krummlauf body-hood, the extent of deflection being 30, 40 or even 90°. Needless to say, even though the concept was eventually made to work efficiently, few Krummläufe were ever issued for service. Whether they had any true utility can only be questioned.



**227** ABOVE. The Cönders gun. *LPI archives.*

Another innovation was the höhere Feuerfolge (HF) system, which sought to achieve ultra-high rates of fire by using a single large propellant charge in a special cartridge to push separate projectiles – from eight to 27, according to a Kummersdorf report in August 1943 – around a helical channel and then up and out through the barrel. The goal was a theoretical fire-rate in excess of 20,000 rounds per minute.

Designed and patented by an employee of the Hungarian state optical manufactory, Bela Zetl, the basic idea proved to work regardless of the German experts' considerable doubts. However, continual jamming was never satisfactorily conquered and what began as a promising anti-aircraft weapon finally disappeared into anonymity.

The HF15, which was to have been fed from a six-chamber cylinder, used a nine-round cartridge. Overall gun-length was

1.58m and it weighed about 20kg. A proposed five-barrel installation was calculated to have a theoretical fire-rate of 107,000rpm!

Experimental guns were actually made and fired. However, even disregarding declining muzzle velocity, evident in the last three bullets of each series, ballistics were very unpredictable and the use of nose-fuzed high explosive projectiles proved catastrophic. Accuracy at 100m was quite acceptable – the bursts usually fell in a 10cm-diameter circle – but the severe problems were never entirely resolved and, it is believed, the whole project was abandoned before the end of the Second World War. A 7.9mm-calibre single-barrel 'one salvo' (nine-projectile) Zetl infantry rifle, claimed to have been developed by Gustloff-Werke in Suhl, had also proved abortive.

Some very interesting documentation will be found in Jim Stonley's articles 'The HF 15 Story' in *Guns Review*, May-August 1988.

# EIGHT

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## THE AMMUNITION

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The principal German smallarms cartridges from the 7.9mm  
Gewehr-Patrone to 9mm pistol rounds.



# Ammunition

## 6.35mm AUTO

This, the standard .25 ACP round introduced with the Baby Browning pistol in 1906, was rare in German service. However, it chambered in the Astra 200 as well as the many pocket pistols purchased by individual soldiers as a last-resort defence. Ammunition was purchased from commercial stocks.

## 7.65MM AUTO

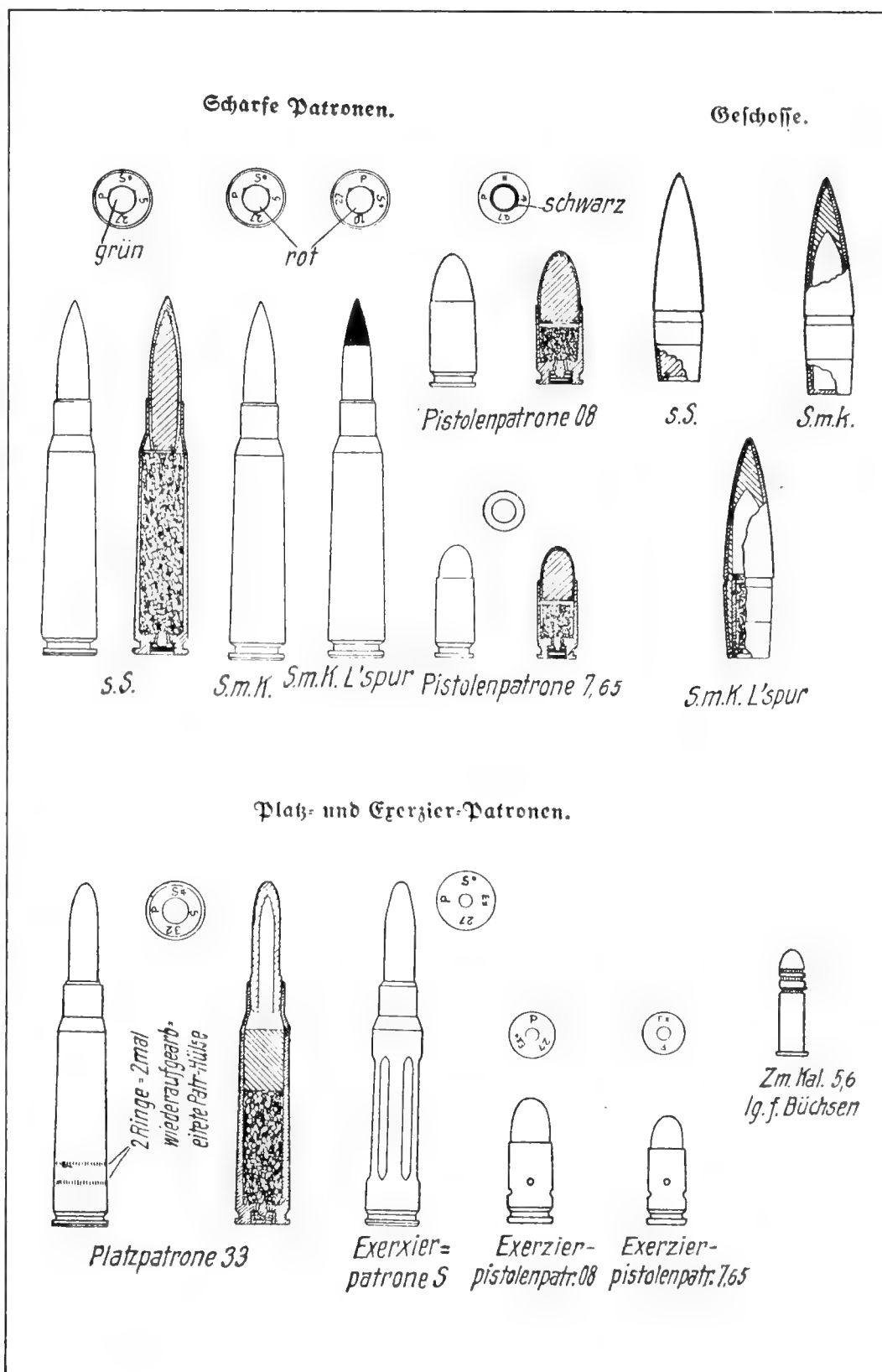
A larger predecessor of the 6.35mm Auto, about seven years older, this Browning-developed cartridge chambered in most of the double-action blowbacks – such as the Walther PP, Mauser HSc and Sauer M38 – plus many of the captured weapons originating in Czechoslovakia, Belgium and the Netherlands. The loading generally comprised a jacketed lead-core bullet in a straight-sided brass rimless case, but was ineffectual at anything other than close range.

## 7.63MM MAUSER

Originally introduced in the 1890s as the '7.65mm Borchardt', this bottleneck pistol cartridge is similar to (but larger than) the 7.65mm Parabellum. It chambered only in the Mauser C/96 and Spanish-made copies. Power was much the same as the 9mm Pist.Patr.08, but the light-weight bullet had a greater tendency to penetrate and often passed through an animate target.

228 RIGHT

Typical German ammunition. From Fischer's *Waffen- und Schiesstechnischer Leitfaden für die Ordnungspolizei*, 1943.



## 7.65MM PARABELLUM

Sharing the case-head dimensions of the 9mm Pist.Patr.08, this reduced-calibre bottleneck-case variant was official issue in Switzerland. However, it was also chambered in some privately purchased Parabellums, plus some of those issued to the RFV in an attempt to exhaust existing commercial stockpiles. Velocity was somewhat higher than the 9mm Pist.Patr.08, but the lighter bullet reduced hitting power considerably.

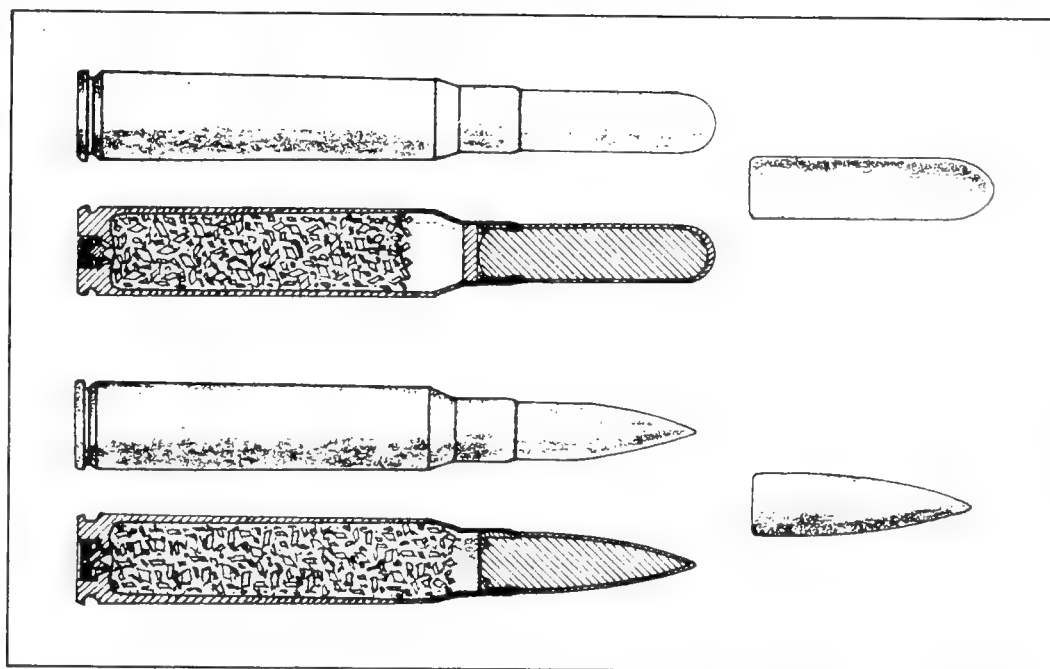
## 7.9MM GEWEHR-PATRONE

The standard 7.9mm rifle cartridge, generally known a '7.9×57mm', was originally made with a brass bottle-neck case. However, successful attempts were made in the mid 1930s to develop steel cases – freeing supplies of brass for more vital tasks – though the first patterns usually had to be brass or copper-washed to guarantee smooth feed. An effectual greyish-green lacquer coating was subsequently perfected, but even this failed to prevent auto-feed troubles and an additional coating of durable wax had to be approved early in 1944. Virtually insensitive to temperature and humidity, oil or grease made the wax sticky; consequently, feed problems were never entirely cured prior to 1945.

All 7.9mm projectiles made since the appearance of the Spitzgeschoss ('pointed bullet') in 1903 have been streamlined, often with a boat-tail.<sup>1</sup> The bullet envelopes were initially made of steel, coated with gilding metal, but zinc envelopes and mild-steel cores were successfully developed in the interests of economy.

### INDIVIDUAL CARTRIDGES

**7.9mm Patr. s.S.** The pre-1918 schwere Spitzgeschoss ('heavy pointed bullet') had a lead core within a gilding-metal clad steel envelope and weighed 12.83gm. The cartridge case – measuring 57.0±0.03mm – had a distinctive green primer annulus, though the bullet was invariably unmarked. Propelled by 2.88gm of Nitrozellulosegewehrpulver ('Nz.Gew.P.'), s.S. bullets attained a muzzle velocity of about 765m/sec. The loaded cartridges measured 80-81mm over-all and weighed about 26-1gm.



**7.9mm Nahpatrone.** Though widely believed to have been developed for silenced weapons, this low-power short-range round was originally introduced for practice on ranges where the full-power round was too dangerous. The Nahpatrone generally had a green primer annulus and an additional green-lacquered case or case-mouth seal. Though the bullet was much the same size and shape as the standard s.S. pattern, the Nahpatrone contained only 0.60gm of Nitropentagewehrpulver (Np.Gew.P., a mixture of nitrocellulose and PETN), weighed only about 23.5gm laden, and attained a velocity of only 275m/sec.

**7.9mm Patr. S.m.E.** The Spitzgeschoss mit Eisenkern ('iron-core pointed bullet') had a mild-steel core, developed in pursuit of economy, and sometimes also a zinc bullet envelope. The bullet was originally about 35.5mm long, though this was soon increased to 37.3mm; it generally weighed about 11.5-11.6gm, 5.8-5.9gm being contributed by the core. The cores were made from special steel wire on lathes or swaging machinery. The bullet envelope was conventionally plated or galvanized zinc. The zinc treatment, which was authorized in November 1942, was regarded as inferior to any other method but acceptable in an emergency. It was originally exclusive to Langbein-Pfannhäuser-Werke of Leipzig, to whom the DWM factory in Lübeck-Schlutup supplied basic material. The primer annulus of S.m.E. rounds was generally blue. The loaded cartridge weighed about 24.6gm and the projectile, driven by a 2.85gm charge of Nz.Gew.P., attained a muzzle velocity of about 700m/sec. A special high-quality loading was developed for snipers' use; 'Patr. S.m.E. für Scharfschützen geeignet' generally appears on the packing labels.

**7.9mm Patr. S.m.E. Lang.** Approved in 1944, this variant of the standard m.E. cartridge contained a 39.5mm 12gm bullet intended to compensate for the replacement of the original heavyweight lead core by lighter mild steel. The two types of cartridge shared the same external

### 229 ABOVE

A comparison between the original 8mm Patr.88 (top) and the standard 7.9mm S-Patrone (bottom). Author's archives.

dimensions, as the longer bullet was simply seated more deeply in the case. The only identifying mark was a practically colourless lacquered coating on the primer.

**7.9mm Patr. S.m.K.** The Spitzgeschoss mit Kern ('cored pointed bullet') was simply the standard armour-piercing design, the 11.53gm projectile containing a 5.77gm steel core inside a plated steel envelope. The primer had a red annulus, but the cartridge case was otherwise unmarked. The loaded round weighed about 25gm, developed a muzzle velocity of about 800m/sec, and 12mm of mild-steel plate could be penetrated at 100m provided the bullet struck at 90° to the plate-surface. A high-power 'verbesserte' version was made for aircraft machine-guns. Loaded with 3.37gm Np.Gew.P. and distinguished by an additional green ring on the bullet, it weighed 25.5gm laden and could attain 860m/sec. Penetration of 14.5mm of mild-steel plate was possible at 100m.

**7.9mm Patr. S.m.K. Leuchtspur.** The standard tracer round, weighing about 23.5gm laden, had a red primer annulus and an additional black bullet tip.<sup>2</sup> The standard bullet weighed about 10.17gm, including the trace compound and a 2.53gm steel core. The core gave the tracer a residual armour-piercing capability, generally regarded as 8mm of mild-steel plate at 100m. Propelled by 2.88gm Nz.Gew.P., the projectile attained about 830m/sec in the Kar.98k. Several types of trace were used, the most common in the opening phases of the war being all-yellow. All-green versions are also known, together with a bi-colour trace that changed from green-to-red

1. Excepting flat-base armour-piercing rounds

2. This is not true of the earliest cartridges, which had differing markings.





or red-to-green about 500m from the muzzle. The labels of these cartridges displayed 'grünrot' and 'rotgrün' respectively. The trace burned out at 800-1,000m.

'Patr. S.m.K. Leuchtspur 100/600' was made for aerial use, the figures referring to the ignition and extinction distances. The cartridge generally exhibited a red primer annulus, while the bullet had a black tip.

The essentially similar 'Patr. S.m.K. Glimmspur' (visible from 150m to 800-1000m) and 'Patr. S.m.K. Glimmspur 100/600' were low-intensity tracers that would not temporarily blind firers at night. They were distinguished by a 5mm black bullet-tip, half the normal measurement. The rarely encountered 'Dunkelspur' was an ultra-dim trace apparently intended for burst-firing at night; it was so dim, indeed, that the trace of a single round was practically invisible.

Most tracers were made in high-velocity 'v' loads for aircraft machine-guns, distinguished either by a green bullet-tip on early examples or an additional 2mm-broad green ring. Charges of 3.53gm Np.Gew.P. raised the laden weight to about 24gm and the muzzle velocity to 895-900m/sec. Armour-piercing performance was slightly enhanced.

Tracer cartridges incorporating a self-destruct element ('mit Zerleger') are also comparatively rare. In these, a pellet compounded of lead azide, PETN and tetracene destroyed the bullet after it had travelled about 2km. However, not only was the self-destruction unreliable, but fragments were scattered so widely that issue was greatly restricted.

### 230, 231 LEFT AND RIGHT

Taken in the mid 1930s and published in the company's fiftieth anniversary history (1939), these pictures show extractor grooves being milled in 7.9mm cartridge cases (left) in the DWM factory in Berlin-Wittenau (right). Note that the machine also bears a DWM maker's plate. *Author's archives.*

**7.9mm Patr. S.m.K.H.** Officially adopted in August 1939, this cartridge was loaded with a special 12.57gm armour-piercing bullet containing an 8.25gm tungsten core. The loaded round was difficult to distinguish from the standard S.m.K., apart from its markings. Cartridges made in 1938-9 had plain tombak-plated bullet envelopes and red primer annuli, while those made later in 1939 featured cupro-nickel cladding and a red primer. Unfortunately, the case-head marks were hidden when the rounds were packed in chargers. Painting bands on the chargers themselves was unsatisfactory; from January 1940 until production was abandoned in March 1942, therefore, the bullet was blacked. The laden cartridge weighs about 26.6gm, a charge of 3.61gm Np.Gew.P. achieving a muzzle velocity of about 910m/sec. However, the increase in power was accompanied by an increase in recoil and firing S.m.K.H. ammunition in automatic weapons had to be restricted to short bursts. Penetration of mild-steel plate at 100m was 19mm

when struck at 90°, or 12.5mm at an angle of 30°. Production was discontinued in 1941 to conserve valuable tungsten for more vital tasks.

**7.9mm Patr. le.S or I.S.** This leichte Spitzgeschoss had a green band across the case-head. Intended for relatively safe practice, particularly in the air, it had a lightweight (5.58gm) bullet with a 2.7gm aluminium core; consequently, the laden round weighed a mere 19.4gm. A practice tracer was also made, identified by an additional black bullet tip and (occasionally) a green band across the casehead. The tracer bullet weighed 6.03gm, 1.62gm being contributed by the aluminium core and 0.6gm by white phosphorus. Laden round weight was about 20gm; muzzle velocity, about 930m/sec. The yellow or yellowish-white trace was visible to about 800m.

**7.9mm Pl.Patr.** The Platzpatrone 33, the standard bulletted blank, was easily distinguished by its 31mm-long red or reddish-purple wooden bullet. The primer annulus was generally plain. These blanks were originally loaded in brass cases that had already been fired once. A knurled ring (1.Sorte) was milled into the case when reloaded as a blank; after use, the expended blank was then returned, reloaded and a second ring (2.Sorte) was added. Cases were discarded after the second blank charge had been fired. Once steel cases became available, however, the ring-distinction was dropped. Despite being loaded with a frangible wood bullet, Pl.Patr.33 could still be dangerous at 25 metres. Specialized blanks were made for the grenade launchers – some shortened, a few bulletted and others with extended case-mouths.

**7.9mm B.Patr.** This explosive incendiary round or Beobachtungs-Patrone – weighing about 24.1gm laden – contained a special 10.82gm bullet, 39.7mm overall, with a base fuze, a detonator and a striker. A small charge of 0.4gm phosphorus in the bullet sufficed as an indicator, giving a cloud of blue-white smoke visible 2km away in perfect conditions, while the detonator contained about 0.45gm of compounded lead styphnate, barium peroxide and calcium silicide. A charge of 2.9gm Nz.Gew.P. gave a muzzle velocity of about 815m/sec in the Kar.98k. The earliest cartridges were distinguished either by a chromium-tipped bullet or, on later examples, by a black bullet with a natural metal tip. The Beobachtungs-Patrone was conceived as a 'spotter' round, performing so well that it was subsequently adopted by several postwar Allied armies. However, respectable incendiary performance led to a change in its primary role as the war progressed.

A high-power 'verbesserte' pattern, made for use in aircraft machine-guns, had an additional 2mm-broad green ring on the bullet. Slightly heavier than the standard pattern – 24.6 instead of 24.1gm – it attained a velocity of 895m/sec with a charge of 3.43gm Nz.Gew.P.

**7.9mm Patr. P.m.K.** This high-explosive incendiary bulletted cartridge ('Phosphorgeschoß mit Kern') was distinguished by a black primer annulus. The 10.17gm bullet – and 37.3mm overall – was unmarked unless the case contained Nz.Gew.P., when it had a narrow green ring. The bullet contained a 2.46gm steel core and a 0.4gm charge of phosphorus. The standard Nz.Gew.P.

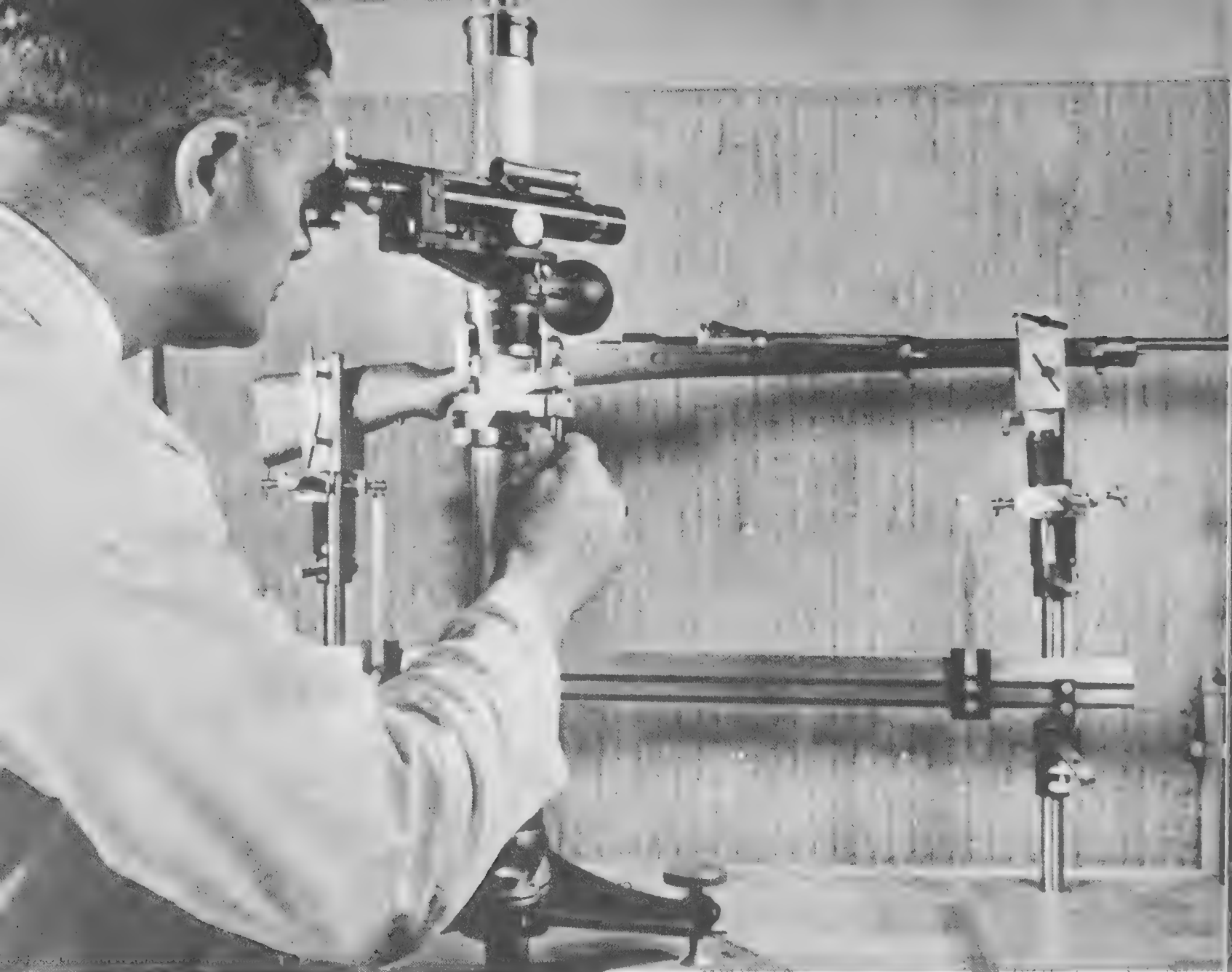
charge permitted a velocity of about 835m/sec; white smoke was emitted to about 450-500m, while 8mm of mild-steel plate could be pierced at 100m provided it was struck at 90° to its surface. The high-power 'v' pattern attained 915m/sec, enhancing armour-piercing performance and increasing the loaded-round weight from 23.3 to 23.8gm.

The original P.m.K. bullets proved to be very sensitive, particularly when temperatures climbed above 45°C on tropical service. Though great care was taken to seal the basal joint between the core and the bullet envelope, often with silver or gold lacquer, premature explosions still occurred. In 1943, therefore, a new-pattern (n.A., neuer Art) S.m.K. bullet was authorized. Better base-closure and the elimination of the sidewall vent resulted in a bullet stable at up to 95°C, though losing the ability of the earlier bullets to ignite thin-skinned fuel tanks simply by passing through them.

**Werkzeug-Patronen.** 'Tool-cartridges' allowed armourers to test the action of weapons without actually firing them. They were strongly made – virtually all in Polte-Werke's Magdeburg factory – and could be considered as gauges. The earliest pattern had a coil-spring in the case between the bullet and the base, but were insufficiently durable; later examples, therefore, had a magnesium-alloy or sturdy plastic strut between the purpose-built 'bullet' and the base of the cartridge case.

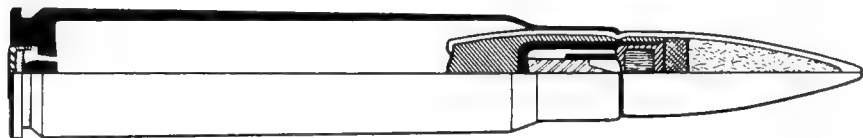
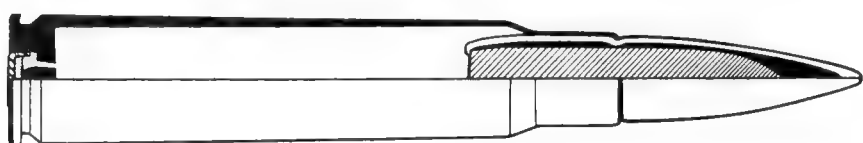
There were also several differing Exerzierpatronen. Many dummies were one-piece extrusions in the shape of the bulletted case, often





**232 ABOVE**

Quality control was an important part of ammunition manufacture. In this DWM photograph, a laboratory technician prepares a Gew.98 for test-firing. *Author's archives.*



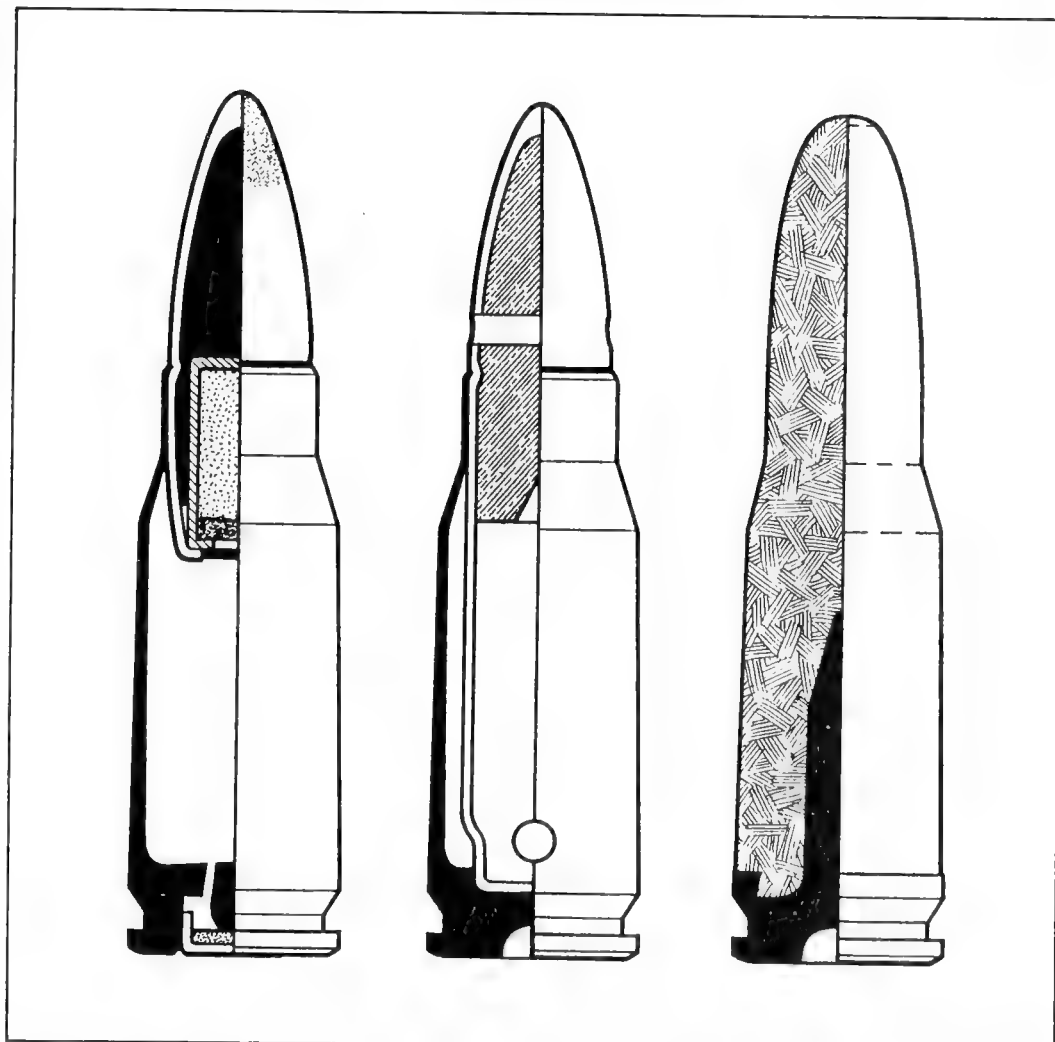
**233 LEFT**

Typical Gewehr-Patrone projectiles. From top: S.m.E. (iron-cored ball round), S.m.K. Leuchtspur (tracer), S.m.K.H. (armour-piercing, tungsten cored) and B.-Patr. (observation round). *Drawings by John Walter.*

fluted longitudinally, but others had standard bullets pinned into fluted brass or steel cases. The last and most effectual pattern, confined to 1941-4, amalgamated a sturdily shanked metal base with a solid plastic body. Made by Polte, Pirkel and Servotechna, among others, synthetic-body dummies were comparatively uncommon.

**Captured ammunition.** The Wehrmacht seized vast stocks of German-type 7.9mm ammunition in Czechoslovakia, Poland and Yugoslavia. These performed similarly but had different markings. *Czech rounds* included the vz.23 ball cartridge, similar to the German S-Patr. but with a blue (later black) primer annulus; the vz.27 ball cartridge intended for short range practice and target-shooting, with a 'T' in the headstamp and a blue-black primer annulus; a vz.28 tracer, with a flat-base bullet and a red annulus; two patterns of vz.30 blank, with a red (rifle) or yellow (machine-gun) wooden bullet; the vz.34 heavy ball, comparable to the s.S. German pattern but with a green annulus; and a vz.34 armour-piercing pattern, with a steel-cored bullet and a white annulus.

The *Polish* cartridges were similar to the Czechoslovakian issue, including 'S' (standard) and 's.S.' (heavy) ball rounds, with black and green primer annuli respectively; an armour-piercing round with a red annulus; an armour-piercing tracer, with a blue annulus and a blue or occasionally black-tipped bullet; a yellow-annulus incendiary round for rifles (yellow tipped bullet) or machine-guns (black bullet); and a selection of blanks, among them a red wood-bulleted pattern for rifles and a blue one for machine-guns. No designations have yet been authenticated.



## 7.9MM KURZ-PATRONE

Introduced for the Maschinenkarabiner after a development history that had stretched back into the 1930s (see ASSAULT RIFLES), this intermediate cartridge had the official German designation 'Pist.Patr.43'; colloquially, as the '7.9mm Kurz' or 7.9×33mm. It may be distinguished from standard rifle ammunition by its shorter case, despite identical case-head design. The standard m.E. ball cartridge weighed 16.7gm laden and measured 47.9mm overall. Its 7.95-8.25gm bullet (overall length 25.4-26mm) had a mild-steel core weighing about 3.9gm inside a gilding-metal plated steel envelope. The charge of 1.57gm Nz.Gew.P. gave a muzzle velocity of about 700m/sec in the short-barrelled Maschinenkarabiner, though armour-piercing performance at 100m was not particularly impressive: merely 6.5mm mild-steel plate if the target was struck at

90° to its surface, or 4.5mm at 45°.

In addition to standard m.E. and S.E. ball cartridges, experimental semi-armour piercing (S.m.K.), tracer (S.m.K.L'spur) and short-range practice rounds (Zielpatronen) have been found, loaded with round lead balls; there are also yellow wood-bulleted blanks for grenade launching; and even 'Werkzeug' tool-rounds. Only eight manufacturers have been linked with Pist.Patr.43 – Draht- und Metallwarenfabrik of Salzwedel ('fva'); Hugo Schneider Lampenfabrik in Leipzig ('wa') and Skarżyńsko-Kamienna ('kam'); Metallwarenfabrik Treuenbitzen, Sebalduhof ('hla'); Polte-Werke's factories in Magdeburg ('aux') and Arnstadt ('auy'); the former Sellier & Bellot plant in Vlasim (code: 'ak'), Teuto Metallwerke of Osnabrück ('oxo'); the former Zbrojovka Brno plant in Považka Bystrica ('dou'); and an unidentified factory using the code 'de'.

Kurzpatronen carriers generally contained either thirty 14-round or 22 twenty-round cardboard cartons. Five

### 234 ABOVE

Three versions of the Kurzpatrone: a tracer and two forms of the tool-cartridge. Drawings by John Walter.

carriers fitted into the standard wooden Patronenkasten 88 (PK.88, 'ammunition box'), giving a total capacity of 2,100 or 2,200 rounds respectively. The packed box weighed about 50kg.

## 7.9MM PATRONE 318

Conceived as an anti-tank rifle cartridge, this was basically a rifle bullet – 33mm overall and weighing about 14.6gm – inserted into a modified 13mm T-Gewehr cartridge case. The projectile is usually listed as 'S.m.K.H.Rs.L'spur': Spitzgeschoss mit gehärtetem Kern, Reizstoff und Leuchtspur ('pointed bullet with a hardened core, lachrymator and trace'). It had a 10mm black tip, while an additional red annulus appeared around the primer.

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## 162 AMMUNITION

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A charge of about 14.7gm of Nitrozellulose Röhrenpulver (Nz.R.P.) could develop a muzzle velocity approaching 1,080m/sec.

The Patr.318 chambered in the principal anti-tank rifles, PzB.38 and PzB.39, and also in an experimental machine-gun. Though 31mm of armour-plate could be defeated at 100 metres, the small bullet could not offer the capacity of 20mm or 30mm cannon-shells and soon faded into obscurity. Five cartridges were contained in each box, whose distinctive red/blue diagonally-split label detailed of the precise charge. It seems that propellant loadings were adjusted from batch to batch to maintain constant performance. The cartridge cases were initially brass, then lacquered or bonderized-and-lacquered steel. Production seems to have been confined almost exclusively to Polte-Werke, Magdeburg ('aux'), and Theodor Bergmann KG, Velten ('cdo'). In addition to the standard ball loading, wood-bulleted blanks and a selection of dummies have been reported.



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### 9MM AUTO/9MM SHORT

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The largest of the original Browning pistol-cartridge series, this dates from 1912. Generally regarded as the smallest effectual service pistol cartridge, it offers better stopping power than the 7.65mm pattern simply because of its greater cross-sectional area. Though chambered in some Walther, Mauser, Sauer and FN blowbacks, it was never popular with the Wehrmacht.

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### 9MM PARABELLUM

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The standard German pistol and sub-machine-gun cartridge, the Pist.Patr.08 was introduced with the Parabellum pistol in 1908. A jacketed lead-core bullet had originally been set in a straight-sided brass case, but various substitute bullets (together with steel cases) were introduced prior to 1945. 9mm Pist.Patr.08 were packed sixteen to a carton, 52 of which fitted into each carrier. Five carriers then went into the Patronenkasten 88 – 4,160 rounds, about 60kg.





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**9mm Pist.Patr.08.** The standard ball cartridge contained an ogival jacketed lead-core bullet weighing 7.5-8gm. The case was brass or steel, the latter being washed with brass, copper or lacquer. The primer usually had a black annulus.

**9mm Pist.Patr.08 m.E.** Introduced in 1940, this cartridge contained a lightweight bullet (6.3-6.5gm) with a mild-steel core and a lead cup in the base of the steel bullet envelope. The bullet is almost always lacquered black.

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**237 RIGHT**

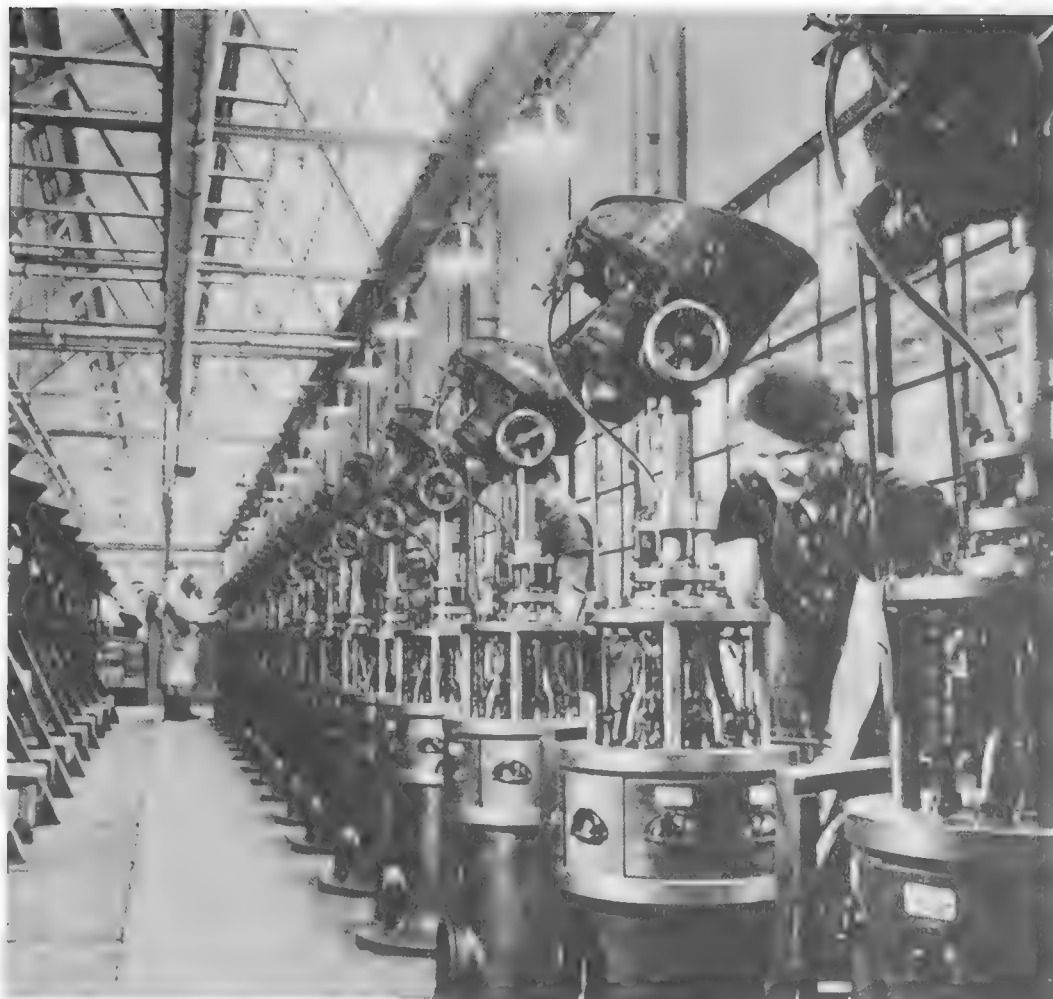
Operators scrutinize bullet-measuring equipment in the DWM Berlin-Wittenau factory. *Author's archives.*

**235 LEFT**

The PzB.39 cartridge box contained ten 9mm Patr.318. *US Army photograph, courtesy of Ian Hogg.*

**236 BELOW**

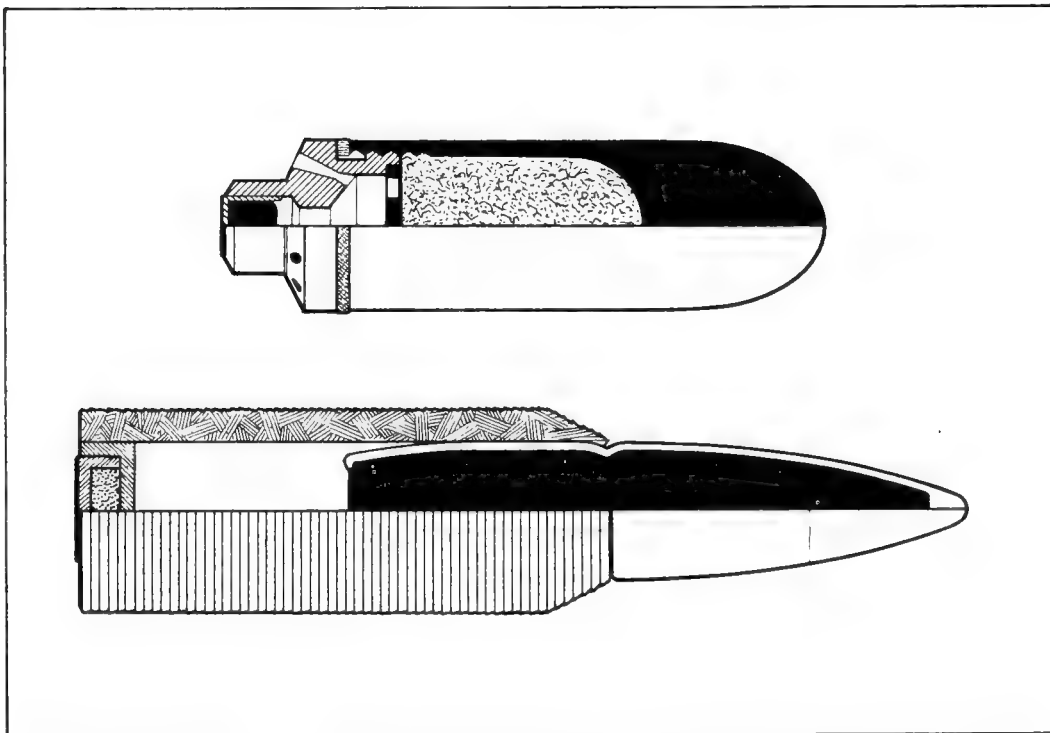
The MSS-41 anti-tank rifle, designed and manufactured in Czechoslovakia, was too complicated to see much service excepting with the Waffen-SS. Though the 9mm Patr.318 offered acceptable penetration, it did not have the capacity for explosives of the larger German 2cm or even the captured Russian 14.5mm designs. *US Army photograph, courtesy of Ian Hogg.*



**9mm Pist.Patr.08 S.E.** Introduced in 1942, these had bullets made of sintered iron. They were lighter even than the m.E. pattern, weighing only 5.9gm, and attained a substantially higher muzzle velocity than the standard '08' bullet; unfortunately, the combination of light bullet and steel case gave persistent feed troubles in automatic weapons. These were never entirely solved.

**9mm Ex.Patr.08.** The Exerzierpatronen were dummies intended for drill purposes. Mostly the work of Polte-Werke of Magdeburg, the Third Reich patterns generally comprise a one-piece nickelled case/bullet unit, longitudinally fluted and often transversely holed. Ex.Patr.08K, with plastic bodies and reinforced metal bases, were made by Polte-Werke, Pirkel and Servotechna in 1940-3.

**9mm Nahpatrone 08.** Originally developed for short-range practice, with a heavyweight bullet and a reduced charge to guarantee subsonic velocity, Nahpatronen eventually achieved more notoriety as silencer ammunition – for which their reduced power was ideal. Their headstamps were generally nothing but 'X'.



## UNUSUAL CARTRIDGES

The Germans were masters at wasting valuable development time on exotic ammunition. The development of small 8mm, 9mm and 11mm-calibre *rocket cartridges*, for example, was never likely to affect the production of conventional smallarms patterns. The rockets carried virtually no payload, and their accuracy was seriously compromised by the continual change in the centre of gravity as the propellant was consumed. The only advantage was that the rockets could be fired from a very simple gun.

In an attempt to squeeze the maximum performance out of 7.9mm weapons, a few experiments were undertaken with collapsing-skirt projectiles on the Gerlich principle in which tapering the bore towards the muzzle permitted the pressure on the projectile base to increase as it moved forward. Gerlich's goal had been power, and the 7.9/5.3mm collapsing-skirt bullet achieved stupendous velocities approaching 1,400m/sec. But it did so at such great expense that the project was soon adjudged a failure – the tapered bore was difficult to machine and tungsten was too valuable to waste in projectiles. The taper-bore system achieved short-lived success only in the 28/21mm taper-bore sPzB.41.

The 7.9mm *Bernstein* bullet was a serious attempt to simplify production when raw material was running low toward the end of the war. Made from mild steel bar-stock, the bullet's claim to fame lay in the driving bands midway along the body. Made of compressed paper, lead or a suitable alloy, these prevented the projectile contacting the bore-wall along its entire length; the mild steel would otherwise have caused excessive bore wear. The principle was similar to that employed in artillery shells, but the war ended while trials of the unique bullet were still underway.

If the Bernstein design was a realistic solution to a potentially serious problem, the *Matter Bullet* came from the realms of fiction. Its envelope contained three pellets of a powerful detonator, lead azide, held under increasing pressure. The pellet nearest the muzzle was the most sensitive; that at the tail, the least sensitive. The promoters asserted that as pressure was released when the Matter bullet struck a hard target, the lead azide would explode with shattering force. By 1945, the Germans appear to have doubted that manufacturing complexity justified the potential gains, even though the Matter Bullet was insensitive under all normal conditions and required no separate fuze.

The most intriguing development was the *caseless cartridge* – allegedly made

## 238, 239 ABOVE

Among the most interesting German ballistic experiments were the rocket (top) and caseless (bottom) cartridges.

at the request of the Reichssicherheits-hauptamt (RSHA), which wished to avoid leaving spent cartridge cases at the scene of an assassination. A conventional white-tipped 8.4mm-diameter s.S.-type bullet, weighing about 13gm, was partially enveloped by a glazed orange-red combustible case containing conventional Nitrozellulosegewehrpulver. A special primer – sandwiched between two wafers of the combustible body material – was set in the base. The cartridge was apparently to be fired in a single-shot gun with longitudinally-split breech system.

Captured Russian 7.65mm *poison bullets*, deliberately (but erroneously) head-stamped 'GECO', were found to contain aconitin. As the Russian ammunition was potentially deadly, minuscule quantities of 9mm Kampfstoff-Patronen 08 (K-Patr.08) were subsequently prepared under the supervision of section 'Chem. g 27' of the RSHA. Made in the Spring of 1944, they had a unique bullet with a nose cavity, a core-channel, a capsule of potassium cyanate, and an 'after core'. When the projectile struck a comparatively unyielding target, the after core flew forward. This crushed the capsule and forced the poison out through the core.

# Pyrotechnics

## FOR ALL SIGNAL PISTOLS

**Leuchtpatronen.** These were projectable day/night signals, visible for several kilometres under ideal conditions. The earliest, which may have been designated 'Leuchtpatrone 35' had a pale grey body with a white closing wad; the case-head and rim were plain. It was replaced by the Leuchtpatrone 41, visible 4km away in day-time, which could be projected to a height of about 160m or, when elevated at about 35°, to a ground-range of about 240m. Individual flares varied between 70,000 and 160,000 candle-power, burning for about seven seconds in the air and then up to five more on the ground. The cartridge was about 83mm long and weighed 100gm. Half of the case-rim was serrated, a white closing wad was used, and the case body bore a single white ring. The case-body, made of thick paper, was pale grey.

The Leuchtpatrone 41 was replaced by the externally similar (but more powerful) Leuchtpatrone 42 with effect from 27 February 1942.

The Fallschirmleuchtpatrone 41 was a star-shell, displaying FALLSCHIRM-LEUCHTPATRONE on the aluminium case (which had a plain head and a semi-serrated rim). A parachute symbol appeared on the white closing wad. A white flare was fired to 80-90m, burning for up to fifteen seconds. As the stylized white parachute

descended, the flare illuminated a 200m-diameter circle. The projectile measured about 135mm overall; the old pattern weighed 100gm, the newer 138gm.

**Signalpatronen.** The signal cartridges came in a wide variety of colour-combinations. Einzelstern Rot, a day/night signal, fired a single red star to about 100m. The signal, which burned for about seven seconds, could be seen 2.5km away. The cartridge was 83mm long and weighed a little over 80gm. Its paper case and closing wad were red, while the case-rim was entirely serrated. Doppelstern Rot was a two-star version, distinguished by an additional black stripe on the red closing wad.

Einzelstern Grün and Doppelstern Grün were similar to Einzel- und Doppelstern Rot, but with plain case rims and markings in green rather than red. Early examples had longitudinal flutes pressed into the case-head walls above the rim, but this distinction was soon abandoned. At only 70gm, Einzelstern Grün was also noticeably lighter and the daylight range of the signal was rated only at 2km.

Yellow signals were also made prior to c.1939. Einzel- und Doppelstern Gelb could be distinguished not by the case rims, which were plain, but by the six radial lines pressed into the base. The cardboard case walls and the closing wads were yellow. Doppelstern Gelb had an additional black band on the wad.

Sternbündelpatrone Weiss mit weissem Vorsignal was a tactical day/night signal cartridge,

135mm long and weighing about 165gm. It fired a single white flare to an altitude of 90m and then followed it almost immediately with six separate white stars visible in daylight to about 2.5km. Marks included the complete designation on its body, together with six white dots around the body and primer. The case-rim was partially serrated, while the mouth was crimped over a white closing wad in such a way that six indentations could be seen or felt.

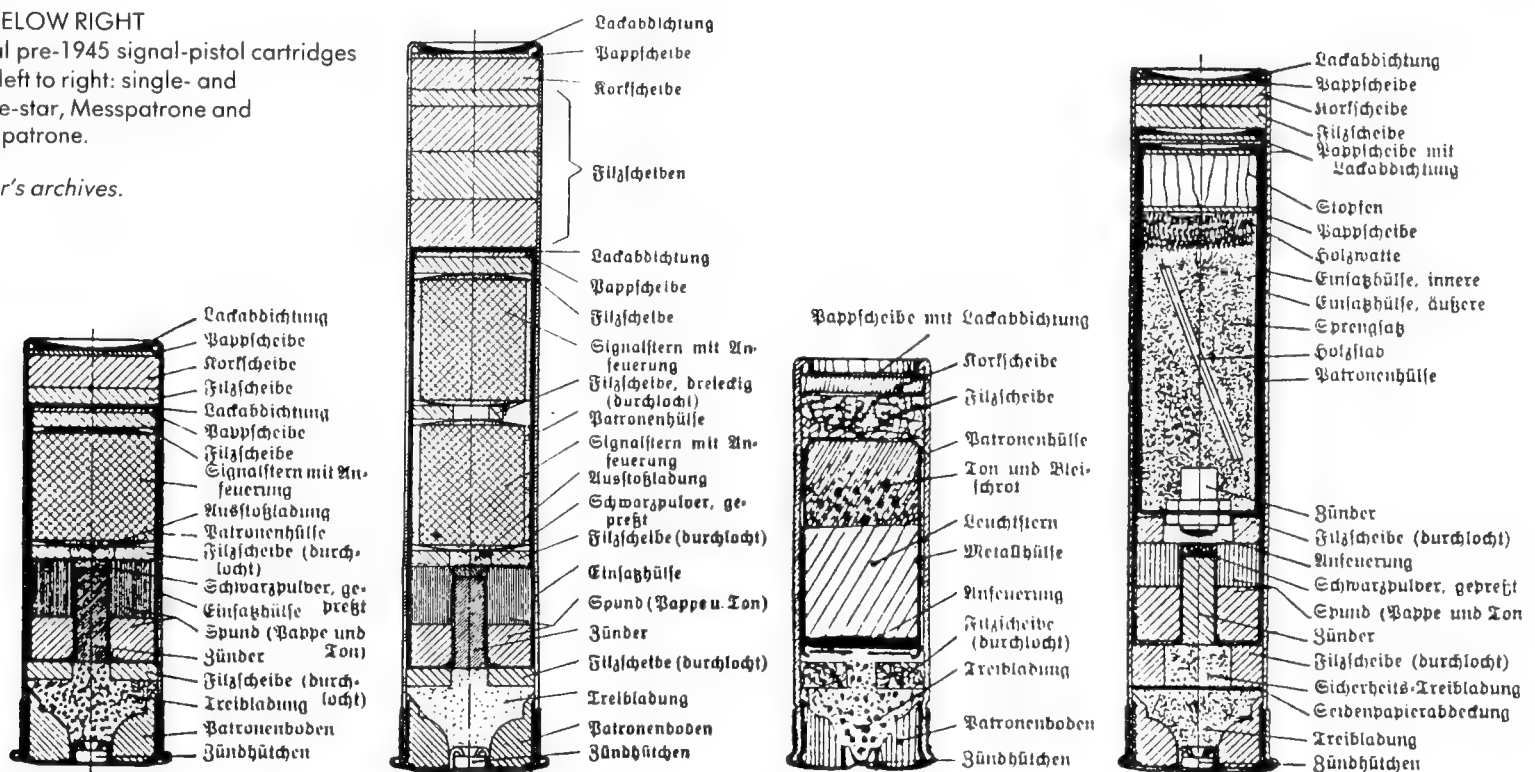
Sternbündelpatrone Rot mit rotem Vorsignal was identical, except that it followed a red flare with red stars. Red marks replaced white on the body and case-head, the case-rim was entirely serrated, and the closing wad was red. Sternbündelpatrone Grün mit rötlichem Vorsignal, a minor variant of the preceding two cartridges, followed a red flare with six green stars. Green marks replaced red on the case, closing wad and case-head, the rim of the last being entirely smooth.

Sternbündelpatrone Rot-Grün mit gelbem Vorsignal, a combination starshell weighing 150gm laden, fired a yellow flare followed by three red and three green stars. The body displayed three green and three red dots, which were repeated on the case-head around the primer. The case-mouth was closed with a grey wad impressed to give a raised diagonal bar within a circle. The case-rim was smooth. The body of Sternbündelpatrone Gelb-Rot-Grün, in addition to its full name, also displayed two yellow, two red and two green dots. The marks were repeated on the

### 240 BELOW RIGHT

Typical pre-1945 signal-pistol cartridges  
From left to right: single- and double-star, Messpatrone and Rauchpatrone.

Author's archives.



case-head, running radially from the primer pocket in three colour-groups. The closing was impressed to give the letter 'Y' within a circle.

Signalpatrone Dreistern Grün, marked with three green dots on the body and three more around the primer, had a plain case-rim and three raised circles on the green closing wad. It fired three large green stars to an altitude of about 90m, the duration of each being about seven seconds.

Kriegsmarine personnel used Signalpatronen (See) for ship/shore or ship/aircraft communication. These had 103mm-long brass cases loaded with up to four white, red or green stars. Cases were invariably closed with a lacquered lead-foil seal. Markings on the case showed the colour and number of the stars — e.g., a red '2'.

**Pfeifpatrone.** Intended solely as a gas-alarm, this 110gm cartridge was distinguished by a blue ring on the case body, a broad blue primer annulus and a smooth case rim; the mark PFEIFPATRONE was also present. The projectile could reach a ceiling of about 100m when fired at an elevation of 65°, emitting a five-second whistling note audible up to 500m away in still conditions.

**Alarmschusspatrone.** This 83mm-long cartridge, weighing about 70gm, projected a 15m flare from the signal-pistol barrel for about ten seconds. It could be identified by its black body and half-serrated case rim.

**Smoke and obscuration cartridges.** The Rauchpatrone, intended for 'artilleristische Messwecke', measured 135mm overall and weighed about 100gm. It had a pale grey cardboard body, a grey closing wad and a half-serrated case rim. Fired to a ceiling of 70m, it emitted grey smoke for a minute.

Messpatrone obscuration cartridges fired a smoke charge to a height of 180-200m, the flight time being 2-5 seconds and the smoke visible for up to 8km in daylight. The 83mm-long cartridge, which weighed 105gm, had a particularly powerful charge and was not intended to be fired from the hand. It had a black cardboard body, a raised black 'M' on the white closing wad, and a half-serrated case rim.

Used to determine wind velocity by measuring the rate and angle of drift, plus drop velocity, the Fallschirmpatrone für Windmessung had an effective ceiling of about 70m. The cartridge — 135mm long and weighing about 133gm — bore the full designation on its body, the closing wad and the case head being white; the case rim was plain.

Used to warn of approaching armoured vehicles in daytime only, Rauchbündelpatrone Violett, weighing 112gm laden, was distinguished by four violet rings around its 135mm-long plain-rimmed aluminium case. Four violet squares were marked around the primer, while the closing wad was also violet. The four smoke pots began to burn after about 3-5 seconds, then for 12-18 seconds on the ground. They could be seen 1-5km away in good conditions.

The Fallschirmrauchpatrone, made in two differing patterns, attained a ceiling of about 80m. It could burn for up to nine seconds, the obscuration being effective at up to 1-5km. The aluminium-case cartridge was 125mm long and

weighed a mere 80gm. A large coloured parachute symbol (and usually the designation) appeared on the case-wall, together with a similar mark impressed into the casehead. Violet or blue closing wads showed the colour of the smoke.

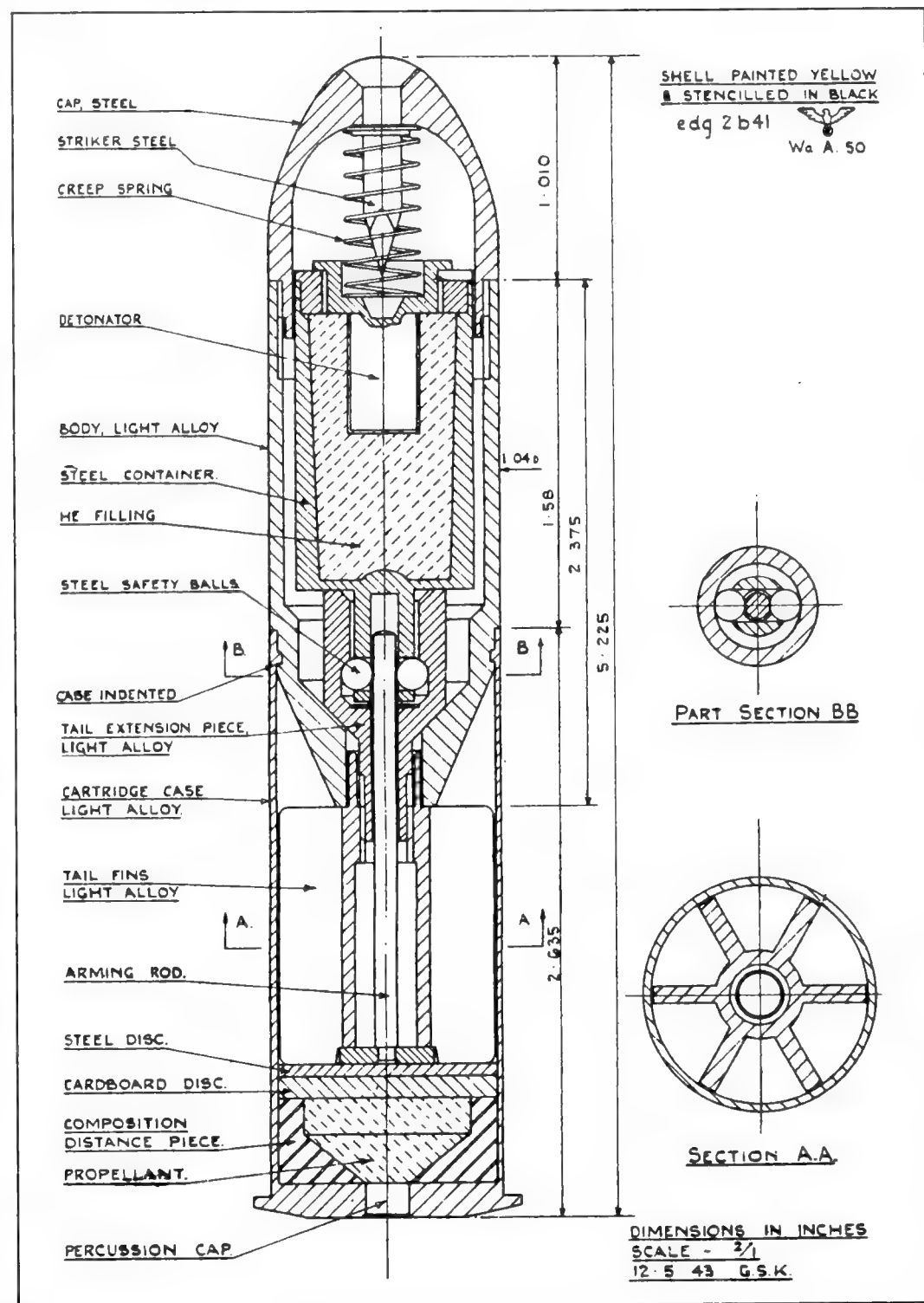
Coloured marker flares, or Rauchzeichenpatronen, were distinguished by large suitably coloured dots on the case-wall and head. The closing wad was also coloured.

#### 241 BELOW

A British official drawing of the Wurfgrate 326, dated 1943. This particular specimen was made by Henckels of Solingen-Gräfrath in 1941.

## FOR LEUCHTPISTOLEN Z AND 42

**High-explosive projectiles.** The Sprenggranatpatrone für Leuchtpistole Z had a rimmed die-cast aluminium cartridge case containing the primer and propellant. A metal washer above the charge, pierced with ten holes, allowed the expanding gases to act on the projectile, the unpainted body of which was cast aluminium. Explosive content was originally 120gm penthrite wax, a nose cavity attempting to capitalize on the Munroe (or Shaped Charge) Effect and



improve its armour-piercing qualities. The head screwed into the body and the impact fuze, whose setback-type arming mechanism contained six balls, was screwed into the head. Complete rounds measured 124mm overall, the cartridge-case body having a diameter of about 28.5mm. The diameter of the short pre-rifled section of the projectile was 27.2mm and that of the fuze about 9mm. Cartridge-case heads bore SPR. Z.

Essentially similar to the preceding shell, Sprenggranatpatrone für Kampfpistole had a more powerful propellant charge in its aluminium cartridge case and could offer a longer range. With a case-head stencilled SPRGR. PATR. K. P., it was introduced in 1943.

**Smoke and obscuration cartridges.** Nachrichtenpatrone Z was similar to the Sprenggranatpatronen, but its cast aluminium body contained a smoke generator, a coloured silk streamer and an ejector charge. The black bakelite nose contained a message form and a small pencil. Propellant flash ignited the delay pellet in the grenade base-plate, which in turn fired the ejector charge to expel the message container, the smoke generator and streamer while the projectile was airborne. The case-head was stencilled NACHR. Z.

Deutpatrone Z was an aluminium bodied orange-smoke grenade, externally similar to the high-explosive patterns. Four strands of quick-match and a blackpowder pellet in the centre of the projectile base ignited the smoke generator in flight, compressed paper in the smoke jets being blown clear when the generator ignited. The case-head displayed DEUT. Z.

The parachute-flare cartridge, or Fallschirm-leuchtpatrone für Kampfpistole, had a cast aluminium body with a white-tipped black bakelite head. Above the screwed-in base plug, which retained a blackpowder pellet, lay the flare and its parachute. The ejector charge ignited to expel the flare and parachute assembly after a pre-determined delay. Case-head markings included F.LEUT. Z.

Nebelpatrone für Kampfpistole was a smoke cartridge, externally similar to the high-explosive designs but containing a special generator, an impact fuze and a charge of blackpowder beneath the flash-cap and striker. Impact ignited the flash-cap, which in turn fired the gunpowder charge to blow off the nosecap and eject the smoke generator.

**Grenade adaptations.** The Nebelhandgranate 42/II was simply a standard oviform hand-grenade adapted to the Kampfpistole by adding a pre-rifled extension and a die-cast aluminium cartridge case. Wurfkörper 361 für Leuchtpistole was made from the components of the standard Eihandgranate 39. It contained 112gm TNT, a detonator system and a combustion fuze (Brennzünder) with a delay of 4-5 seconds. Mounted on a plastic tube containing the propelling charge and the primer, the muzzle-loaded grenade was armed by removing its lateral safety pin – often absent from 1944-5 vintage examples. Olive-green bodied Wurfkörper were 6.89 inches long and had an effective range of 60-80m. They were packed in fifteens in a zinc-lined steel packet (Blechbehälter).

The yellow-bodied die-cast Wurfgranatpatrone 326 für Leuchtpistole had a separate

aluminium or brass-case cartridge containing the primer and propellant. Charged with TNT, and not unlike a small mortar shell, the projectile had four stabilising fins. After flying about 12m, airflow pressure armed the Wurfgranate by extracting the automatic safety. An emergency Leuchtpistole grenade was made by attaching the standard Handgranate 24 to spare propelling tubes. This expedient probably dated either from the end of 1944 or 1945.

Panzer-Wurfkörper 42 für Leuchtpistole (PzWK.42 LP) was basically a grenade with a hollow 'shaped head' charge of TNT, the cavity being protected by a thin sheet-steel cap. The propellant tube fitted loosely into the barrel until a pre-rifled band was inserted in the muzzle. Gases generated by firing then drove a shear bolt forward to cut the pin linking the projectile and propelling tube. The graze fuze was activated during firing by set-back.

Sprenggranate für Leuchtpistole Z was contained in a varnished steel cartridge case carrying the primer and propellant. A combustion fuze lay in the projectile base, but packing cases bore the legend 'Achtung! Nur aus Panzern oder gleichwertiger Deckung verfeuern! Brennzeit 1 Sek.' ('Danger! Only fire from tanks or similar cover! Burning time: 1 second'). As accidents were common, the high-explosive shell was heartily disliked. Issued only in 1944-5, it was regarded as a great secret by the Heereswaffenamt.

## 242 RIGHT

Typical pre-1945 box labels for 7.9mm tracer ammunition. From top to bottom: green/red trace, loaded by the WASAG Reinsdorf factory in 1936 from WASAG and Polte-made components; a white 100-600m tracer, loaded by Polte (with bought-in propellant and primers) in 1940; and high-power dark-ignition tracers loaded by DWM Lübeck-Schlutup ('edq') in 1942, but incorporating primers made by DWM Karlsruhe ('faa') and propellant from Deutsche Sprengchemie, Moschwig ('mog').

### Patr. S.m.K. L'spur (grünrot) Rdf. 2. L. 36

Nz. Gew. Bl. P. (2 · 2 · 0,45): Rdf. 30. L. 36  
Patrhn.: S\* P. 47. L. 36 Gesch.: Rdf. 59 L. R. 36  
Geschöbteile: P. Bleihemd: Rdf.  
Satz: Rdf. 6. L. 36 Zdh.: L. 353/36

### Patr. S.m.K. L'spur 100/600 (weiß) P. 163 I. L. 40

Nz. Gw Bl. P. (2 · 2 · 0,45): Mog 1939/172  
Patrhn.: S\* versch. L.  
Gesch.: P. 163 I. L. 40 Geschöbteile: P. 163  
Satz: P. 163. Zdh. 88: RWS 613. L. 40

### 15 Patronen S.m.K. Bl'spur - v edq 1. L. 42

Np. Gew. R. P. (1,8-1,3/0,2) mog. 1941/34  
Patrhn. S\* edq versch. L. 41  
Geschöbteile: edq 1. L. 42  
Zdh. 88: faa 48. L. 41 Bl'spur edq 1. L. 42



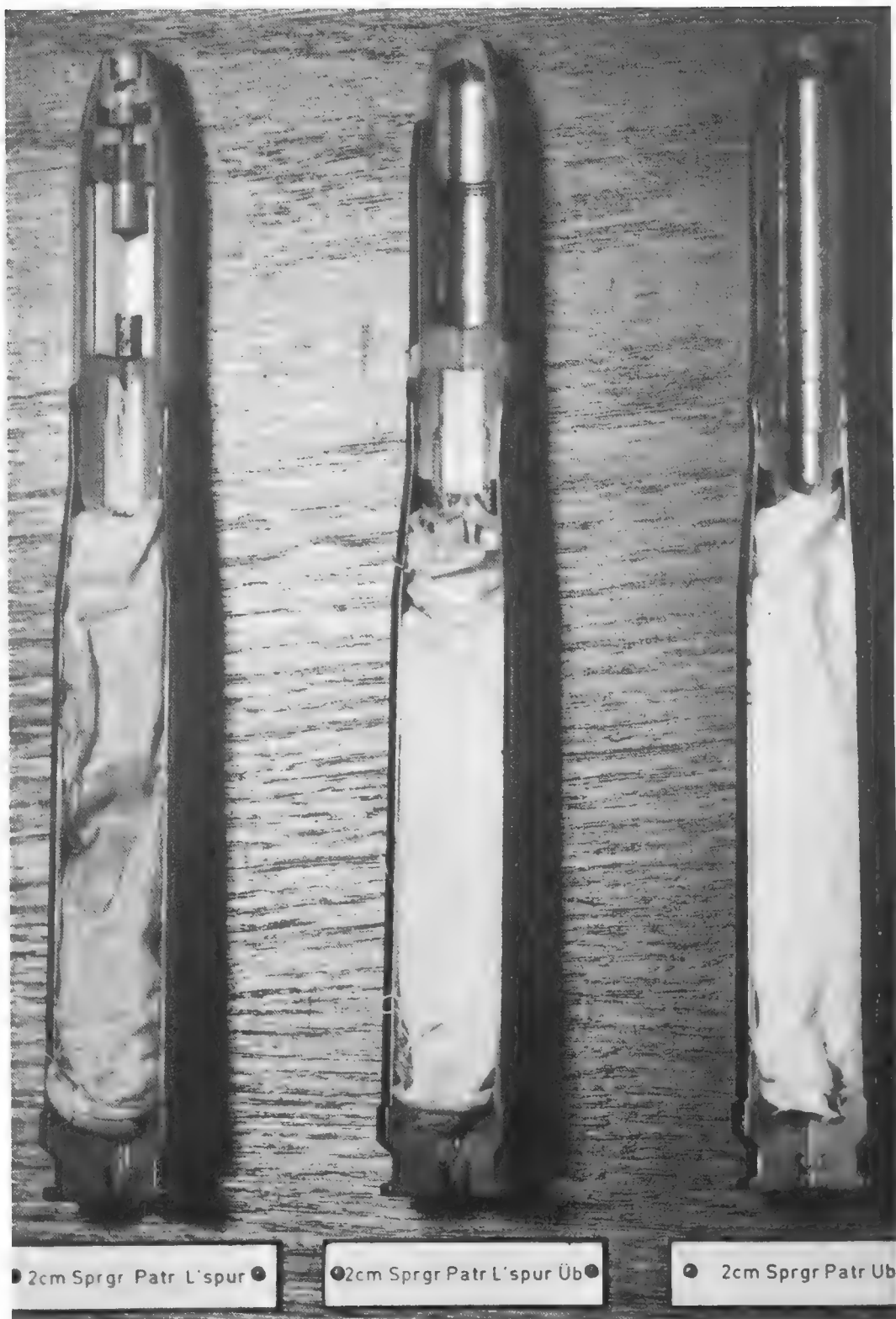
# Packaging

German smallarms ammunition was packed conventionally. Though the colour of the primer annuli and case-mouth seals varied from calibre to calibre, an identification system was common to all German small arms packaging. A white label signified ball ammunition; yellow or buff was tracer; green was incendiary; pink, pale reddish-orange or brick-red identified bulletted blanks; and red-white (divided diagonally) showed that the armour-piercing bullets had tungsten cores. The overprinting was generally in black, excepting certain projectile designations (e.g., 'S.m.K.') and some of the major instructions. These were red.

An additional vertical medial blue stripe identified steel-case ammunition; a green diagonal stripe, running upwards to the right from the bottom left corner, marked practice rounds; and a black horizontal bar along the top edge of the label denoted explosive/incendiary rounds.

Large-scale overprints, almost always in red ink, showed other characteristics: 'i.L.' or 'in Ladestreifen' for rifle ammunition packed in chargers, only to be used in machine-guns in emergency; 'für M.G.' ('for machine-guns') or 'nur für M.G.' ('only for machine-guns') on machine-gun ammunition, only to be used in rifles in emergency; 'für Gew.' or 'nur für Gew.' for ammunition to be used only in rifles; and 'Inhalt o.L.' – in black – for charger-packed ammunition that had been dismembered into cartons. 'Unbekannt', 'Lief.unbek.' or 'Lieferung unbekannt' indicated ammunition of unknown origin, or had come from mixed batches.

More than one identifier may appear on a single label. Supplementary rectangular labels provided information such as 'Nicht zur Überschossen und Schiessen durch Lücken geeignet' ('unsuitable for overhead fire or for firing through gaps', black on white) or 'Nicht geeignet für Gesteuerte Bordwaffen' ('unsuitable for synchronized guns', red on white) may also be encountered. Triangular examples may include 'Nur zu Übungszwecken' ('only for practice use'), black on pale green or bluish-green stock.



Cartridges intended specifically for tropical use have an additional case-mouth seal, usually matching the primer annulus, to prevent excessive heat and/or moisture penetrating them. Their box labels usually include 'f.Trop.'

**243** ABOVE

Typical 2cm Flak ammunition. *From left to right:* high-explosive/tracer and a practice version of the same round, and high-explosive practice.

*By courtesy of Ian Hogg.*

# NINE

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## THE APPENDICES

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A concise list of the principal German manufacturers' codes,  
and a select Bibliography.



## APPENDIX ONE

# Manufacturers' codes

The list that follows contains most of the best-known companies involved in the production of smallarms, but can only be a guide; the complete codelist, *Liste der Fertigungskennzeichen für Waffen, Munition und Gerät...* (Berlin, 1944) runs to nearly eight hundred pages. Details of the codes in the 'aaa'- 'azz' group were published in November 1940, after which the authorities worked steadily through the alphabet until the 'oaa'- 'ozz' block was reached in October 1944. Unfortunately, though r-, s-, and t-codes have been reported, few have yet been identified.

Efforts have been made to identify products in the list below, adapted with permission from *Hitler's Secret Codes* (ed.: John Walter, Lyon Publishing, 1989). At the time of writing, however, this information is still sketchy and incomplete. The product codes are: A artillery and artillery components; B bayonets; CC cartridge-clips and chargers; L holsters, magazine pouches, harness and leatherware; MAG smallarms magazines; MG machine-guns and components; MGL machine-gun feed-belts and links; MK machine-carbines; MP submachine-guns; OPT optical equipment; PY pyrotechnics, including signal-pistol ammunition; R rifles; SA miscellaneous and/or unidentified smallarms components; SAA smallarms ammunition and components; and SP signal pistols.

aak: Waffenwerke Brünn AG, Prag XIII, Wrsovice. SA  
 aam: Auto-Union AG, Chemnitz and Siegmarschönau bei Chemnitz. MG  
 ab: Mundlos AG, Nähmaschinenfabrik, Magdeburg-Nord. B  
 ac: Carl Walther Waffenfabrik AG, Zella-Mehlis, Thüringen. MK P R SA SP  
 ad: Patronen-, Zündhütchen- und Metallwarenfabrik, Schönebeck an der Elbe, Sachsen. SAA  
 aek: F. Dusek Waffenerzeugung, Opocno bei Nachod, Poland. SA  
 agv: Berg & Co., Solingen-Ohligs. B  
 aj: Sörensen & Köster, Neumünster in Holstein (Brachenfeld): PY  
 ajf: Junker & Ruh AG, Karlsruhe in Baden. MP SA  
 ak: Munitionsfabriken vormals Sellier & Bellot, Prague, Czechoslovakia (Vlasim works). SAA  
 al: Deutsches Leucht- und Signalmittelwerk, Dr. Feistel KG, Schönhagen bei Trebbin Kreis Teltow. PY  
 am: Gustloff-Werke, Otto Eberhardt Patronenfabrik, Hirtenberg, Niederdonau. SAA  
 amn: Mauser-Werke KG, Neuwied. SA  
 amo: Mauser-Werke KG, Waldeck Bezirk Kassel. SA  
 ap: Deutsches Leucht- und Signalmittelwerk, Dr. Feistel KG, Wuppertal-Ronsdorf. PY  
 aqx: Rheinmetall-Borsig AG, Werk Tegel, Berlin-Tegel. A SA  
 ar: Mauser-Werke AG, Werk Borsigwalde, Berlin-Borsigwalde. MG R SA

asb: Deutsche Waffen- und Munitionsfabriken AG, Berlin-Borsigwalde. CC SA SAA  
 asr: 'HAK'-Hanseatisches Kettenwerk GmbH, Hamburg. SAA  
 asw: E. & F. Hörster, Solingen. B  
 auc: Mauser-Werke KG, Köln-Ehrenfeld. SA  
 auj: Monheimer Ketten- und Metallwarenindustrie Pötz & Sand, Monheim-Düsseldorf. PY  
 auu: Patronenhülsen- und Metallwarenfabrik AG, Rokycany bei Pilsen, Czechoslovakia. SAA  
 aux: Polte-Werke, Magdeburg. CC MGL SAA  
 auy: Polte-Werke, Grüneberg (Nordbahn). SAA  
 auz: Polte-Werke, Arnstadt, Thüringen. SAA  
 avt: Silva Metallwerke GmbH, Magdeburg. SAA  
 avu: Silva Metallwerke GmbH, Genthin. SAA  
 awj: The Yale & Towne Manufacturing & Company, Velbert, Rheinland. AA MAG  
 awt: Württembergische Metallwarenfabrik AG, Geislingen-Steige. SA SAA  
 ax: Feinmechanische Werke GmbH, Erfurt, Thüringen. R SA  
 axq: Erfurter Laden-Industrie, Erfurt-Nord. AA SAA  
 axs: Berndorfer Metallwarenfabrik Arthur Krupp AG, Amstetten. AA F  
 aye: Olympia Büromaschinenwerke AG, Erfurt. MAG  
 ayt: 'Erma', B. Geipel GmbH, Erfurt. MP SA SP  
 ba: Sundwiger Messingwerk vorm. Gebr. von der Becke KG, Sundwig Kreis Iserlohn. SAA  
 bcb: Otto Graf, Leipzig. L

bcd: Gustloff-Werke, Weimar. A R SA  
 bdq: Ehrhardt & Kirsten, Tauscha bei Leipzig. L  
 bdr: Richard Ehrhardt, Pössneck in Thüringen. L  
 be: Berndorfer Metallwarenfabrik Arthur Krupp AG, Berndorf, Niederdonau. SAA  
 beh: Ernst Leitz GmbH, Wetzlar. OPT  
 bek: Hensoldt Werk für Optik und Mechanik, Inh. Dr. Hans Hensoldt, Herborn (Dillkreis). OPT  
 bh: Brünnner Waffenwerke AG, Brünn, Czechoslovakia. SA SAA  
 bk: Metall-, Walz- und Plattierwerke, Hindrichs Auffermann AG, Wuppertal-Barmen. SAA  
 bky: Böhmsche Waffenfabrik AG in Prag, Ung. Brod (Mähren). P SA  
 bla: E.G. Leuner GmbH, Bautzen. CC L  
 blc: Carl Zeiss, Militärabteilung, Jena. OPT  
 bmd: Max G. Müller, Nürnberg-Ost. L  
 bmj: M. Hensoldt & Söhne, Optische-Werke AG, Wetzlar. OPT  
 bml: Hans Römer, Neu-Ulm/Donau. L  
 bmn: Böttcher & Renner, Nürnberg-Ost. L  
 bmo: Hans Deuter, Augsburg. L  
 bmz: Minerva Nähmaschinenfabrik AG, Boskowitz, Czechoslovakia. SA  
 bne: Metallwerke Odertal GmbH, Odertal Post Lautenberg/Harz. SAA  
 bnl: Ostmarkwerke GmbH, Werk Prag, Gbell bei Prag, Czechoslovakia. A MG SA  
 bnz: Steyr-Daimler-Puch AG, Steyr. MG P R SA  
 bpd: Optische Anstalt C.P. Goerz GmbH, Wien. OPT  
 bpr: Johannes Grossfuss, Döbeln in Sachsen. MG SA  
 bqt: Pyrotechnische Fabrik Eugen Müller, Wien XXI. PY  
 bv: Rothmüller-Mewa Blechwarenfabrik, Wien 20. PY  
 byc: Aug. Klönne, Brückenbauanstalt, Dortmund. SAA  
 bye: 'Hanomag'-Hannoversche Maschinenbau AG vorm. Georg Egestorff, Hannover-Linden. SAA  
 byf: Mauser-Werke KG, Oberndorf am Neckar, Württemberg. A MG P R SA  
 bym: Genossenschafts Maschinenhaus der Büchsenmacher, Ferlach/Kärnten. B SA  
 byw: Johannes Schäfer, Stettiner Schraubenwerk, Stettin. SA  
 bzt: Fritz Wolf, Rob. Sohn, Gewehrshafffabrik, Zella-Mehlis. SA  
 ca: Vereinigte Deutsche Nickelwerke AG, vorm. Westfälisches Nickelwalzwerk Fleitmann, Witte & Co., Schwerte/Ruhr. SAA  
 cag: D. Swarovski, Glasfabrik und Tyrolit-Schleifmittelwerke, Wattens/Tirol. OPT  
 cbl: Vereinigte Deutsche Metallwerke AG,

Zweigniederlassung Süddeutsche Metallindustrie, Nürnberg. PY  
 ccx: Optische und Feinmechanische Werke, Hugo Meyer & Co., Görlitz. OPT  
 cdc: Kern, Kläger & Co., Berlin N58. L  
 cdg: Auwaerter & Bubeck KG, Stuttgart. L  
 cdo: Theodor Bergmann & Co. KG, Waffen- und Munitionsfabrik, Velten. SAA  
 cdp: Theodor Bergmann & Co. KG, Waffen- und Munitionsfabrik, Bernau. SAA  
 ce: J.P. Sauer & Sohn, Suhl, Thüringen. P R SA  
 cey: Karl Budischovsky & Söhne, Oesterreichische Lederindustrie AG, Wien. L  
 cf: Westfälisch-Anhaltische Sprengstoff AG, Oranienburg. SAA  
 cg: Finower Industrie GmbH, Finow/Mark. SAA  
 cgn: Rohrbacher Lederfabrik Jos. Poeschl's Söhne, Rohrbach/Oberdonau. L  
 cgu: Stolla's Söhne, W.K., K. & A. Stolla, Wien 65. L  
 ch: Fabrique Nationale d'Armes de Guerre SA, Herstal-lèz-Liège, Belgium ('DWM, Werk Lüttich'). P SA SAA  
 clc: Richard Abr. Herder, Solingen. B  
 clg: Ernst Melzig, Liegnitz. L  
 cnd: National Krupp Registrier Kassen GmbH, Fabrik Berlin-Neukölln. MAG SA  
 cny: C. Pose, Berlin O34. L  
 cof: Carl Eickhorn Waffenfabrik, Solingen. B SA  
 con: Franz Stock, Berlin-Neukölln. SA  
 cos: Merz-Werke Gebr. Merz, Frankfurt am Main, Rheinland. SA  
 cpj: Havelwerk GmbH, Brandenburg/Havel. A MG SA  
 cpo: Rheinmetall-Borsig AG, Berlin-Marienfelde. A SA  
 cpq: Rheinmetall-Borsig AG, Guben. A MG SA  
 cqh: Clemen & Jung, Solingen. B  
 cra: Alkett-Altmarkische Kettenwerke GmbH, Werk II, Berlin-Tegel (later 'Maget'-Maschinenbau und Gerätebau GmbH). MG SA  
 crs: Paul Weyersberg & Co., Solingen. B SA  
 csm: Knorr-Bremse AG, Berlin-Lichtenberg and Berlin O112. MG SA  
 cts: Märkisches Werk, H. Wilmsmann GmbH, Halver in Westfalen. SAA  
 cua: Röhm Gesellschaft, Zella-Mehlis, Thüringen. SA  
 cul: Ernst Pack & Söhne, Solingen. B  
 cvb: Otto Sindel, Berlin O27. L  
 cvc: L. Zeschke Nachfolger, Gebr. Zeuschner, Müllrose bei Frankfurt an der Oder. L  
 cvl: WKC Waffenfabrik GmbH, Solingen-Wald. B SA  
 cww: Carl Weiss, Braunschweig. L  
 cxb: Moll Lederwarenfabrik, Goch, Rheinland. L  
 cxm: Gustav Genschow & Co. AG, Berlin SO36. L SAA  
 cxn: Emil Busch AG, Rathenow. OPT  
 cyq: Spreewerke GmbH, Metallwarenfabrik, Berlin-Spandau. A P SA  
 dbg: Dynamit AG, vormals Alfred Nobel & Co., Düneberg. SAA  
 dde: Robert Larsen, Berlin SW68. L  
 ddl: Remscheider Hobelmesserfabrik Josua

Corts Sohn, Remscheid. B  
 ddx: Voigtländer & Sohn AG, Braunschweig. OPT  
 dfb: Gustloff-Werke, Waffenwerk Suhl, Suhl in Sachsen. MG  
 dfc: L. Ritgen, Karlsruhe. L  
 dhp: H. Burgsmüller & Söhne GmbH, Kreiensen/Harz. SA  
 dkk: Friedrich Offermann & Söhne, Bensberg. L  
 dla: Karl Barth, Waldbrühl/Rheinland. L  
 dlu: Ewald Lünenschloss, Solingen. L  
 dmo: Auto-Union AG, Chemnitz, Rösslerstrasse. SA  
 dnf: Rheinisch-Westfälische Sprengstoff AG, Stadeln bei Nürnberg. SAA  
 dnh: Rheinisch-Westfälische Sprengstoff AG, Durlach bei Karlsruhe. SAA  
 dom: Westfälische Metall-Industrie AG, Lippstadt. SAA  
 dot: Waffenwerke Brünn AG, Brünn. B MG R SA SAA  
 dou: Waffenwerke Brünn AG, Povaszka Bystrica. CC SA SAA  
 dov: Waffenwerke Brünn AG, Wsetin. A MG SA  
 dow: Waffenwerke Brünn AG, Prerau (later 'Opticotechna GmbH, Werk Prerau/Protektorat'). OPT  
 dox: Waffenwerke Brünn AG, Podbrezová. SA  
 dpv: Zeiss-Ikon AG, Dresden. OPT  
 dpw: Zeiss-Ikon AG, Goerzwerk, Berlin-Zehlendorf. OPT  
 dpx: Zeiss-Ikon AG, Contessawerk, Stuttgart. OPT  
 dqf: Remo-Gewehr-Fabrik Gebrüder Rempt, Suhl, Thüringen. SA  
 dsh: Waffenfabrik Ing. F. Janacek, Prag-Nusle II, Czechoslovakia (foundry at Teinitz a/S). A SA  
 dta: A. Waldhausen, Inh. M. Bruchmann, Köln. L  
 dtv: C. Otto Gehrckens, Pinneberg. L  
 dvr: Johann Fröhlich, Wien 101/XV. L  
 dye: Erste Alpenländische Pyrotechnischefabrik Ed. Pitschmann & Co., Innsbruck. PY  
 dyo: J.M. Eckart, Ulm-Donau. L  
 dzl: Optische Anstalt Oigee GmbH, Berlin-Schöneberg. OPT  
 eba: Metallwarenfabrik Scharfenberg & Teubert GmbH, Breitung-Werra. SAA  
 eca: Oskar Fischer GmbH, Markdorf in Baden. PY  
 ecb: Gebr. Bock, Berlin-Buchholz. PY  
 ecc: Pyrotechnische Fabrik Oskar Lünig, Spezialfabrik für Kunstfeuerwerke, Möhringen (Fildern). PY  
 ecd: Carl Lippold Pyrotechnischefabrik, Wuppertal-Elberfeld. PY  
 edg: J.A. Henckels Zwillingswerk, Solingen-Gräfrath. B SA  
 edq: Deutsche Waffen- und Munitionsfabriken AG, Lübeck-Schlutup. SAA  
 eea: Hermann Weihrach, Zella-Mehlis, Thüringen. SAA  
 eej: Märkisches Walzwerk GmbH, Strausberg Bezirk Potsdam. SAA  
 eem: Selve-Kronbiegel Dornheim AG, Munitionsfabrik Sömmerda in Sachsen. SAA

eeo: Deutsche Waffen- und Munitionsfabriken AG, Posen. A MG SA  
 eeu: Lieferungsgemeinschaft westthüringische Werkzeug- und Metallwarenfabriken eGmbH, Schmalkalden in Thüringen. SP  
 eev: Fr. Braun, Tembach-Dietharz/Thüringen. SAA  
 eey: Metallwarenfabrik Treuenbrietzen GmbH, Roederhof. SAA  
 emj: Adalbert Fischer, Berlin C2. L  
 emp: Dynamit AG, vormals Alfred Nobel & Co., Empelde bei Hannover. SAA  
 emr: Adalbert Fischer, Guttstadt in Ostpreussen. L  
 eom: H. Huck, Nürnberg. SAA  
 eqf: Karl Böcker, Waldbrühl/Rheinland. L  
 eqr: G. Passier & Sohn, Hannover. L  
 ern: W.G. Dinkelmeyer, Kötzing. SAA  
 eso: Optische-Werke G. Rodenstock, München. OPT  
 eue: Otto Reichel, Inh. Rudolf Fischer, Lengfeld/Erzgebirge. L  
 evg: Max Oswald, Karlsruhe. L  
 ewx: Franz & Karl Voegels, Köln. L  
 exw: Metallwerke GmbH, Holleischen Kreis Mies (Sudetengau). SAA  
 fa: Mansfeld AG für Bergbau und Hüttenbetrieb, Abteilung Kupfer- und Messingwerke, Hettstedt/Südharz. SAA  
 faa: Deutsche Waffen- und Munitionsfabriken AG, Karlsruhe in Baden. SAA  
 fb: Mansfeld AG, Rothenburg/Saale. SAA  
 fd: Stollberger Metallwerke KG von Asten, Lynen und Schleicher, Stolberg/Rheinland. SAA  
 fde: Dynamit AG, vormals Alfred Nobel & Co., Förde. SAA  
 fer: Metallwerke Wandhofen GmbH, Schwerte/Ruhr. SAA  
 ffc: Friedr. Abr. Herder Sohn, Solingen. B  
 ffk: Wittkop & Co., Bielefeld. L  
 fnh: Böhmisches Waffenfabrik AG in Prag, Strakonitz. P SA  
 fnj: Alexander Coppel GmbH ('Alcoso'), Solingen. B  
 fnk: Metallwerke Adolf Hopf AG, Tambach-Dietharz in Thüringen. PY  
 ftt: Vereinigte Lederwaren-Fabriken Eugen Huber, München. L  
 fuq: Cottbusser Lederwarenwerk Curt Vogel KG, Cottbus. L  
 fva: Draht- und Metallwarenfabrik GmbH, Salzwedel. SAA  
 fxo: C.G. Haenel, Suhl. B MAG MK MP SA  
 fze: F.W. Höller, Solingen. B SA  
 fzs: Heinrich Kriehoff, Suhl. MG P R SA SP  
 ga: Hirsch Kupfer- und Messingwerke AG, Finow/Mark. SAA  
 gal: Wagner & Co. GmbH, Mühlhausen in Thüringen. MG R SA  
 gaq: Otto Stephan, Mühlhausen in Thüringen. L  
 gce: Lieberknecht & Schurg Etuis-Fabrik, Coburg. L  
 gcy: L.O. Dietrich, Vesta-Nähmaschinenwerke, Altenburg in Thüringen. MG SA  
 gfg: Carl Hepting & Co., Stuttgart-Feuerbach. L  
 ghf: Fritz Kiess & Co GmbH, Waffenfabrik, Suhl. SA



# 244 ABOVE

This view of a PzB.39 breech shows that the gun, serial no.5553, was made by Gustloff-Werke, Suhl, in 1941. *Courtesy of Ian Hogg.*

gmo: Rahm & Kampmann, Kaiserslautern. L  
gpf: Carl Tesch, Berlin N4. L

gpt: Gustav Bittner, Weipert/Sudetengau. SA  
SP  
grz: Gebr. Krüger, Breslau. L  
gtb: J.F. Eisfeld, Pulver- und Pyrotechnische  
Fabriken GmbH, Güntersberge. PY  
gug: Ungarische Optische Werke AG,  
Budapest. OPT  
guj: Werner D. Kuehn, Berlin-Steglitz. OPT

gut: Walter Schürmann & Co., Bielefeld. L  
gxq: Henseler & Co., Inh. Fritz Henseler, Ulm-  
Donau. L  
gxy: Gebr. Klinge, Dresden-Löbtau. L  
gyo: Hans Dinkelmeyer, Nürnberg. L  
gyu: Gebr. Michera, Prag VII and Stara-  
Tura/Slowakei. SAA  
ha: Wielandwerke AG, Ulm am Donau. SAA



- ham: Dynamit AG, vormals Alfred Nobel & Co., Hamm. SAA
- has: Pulverfabrik Hasloch, Hasloch am Main. SAA
- hck: Georg A. Lerch GmbH, Berlin C2. L
- hee: Ikaria-Werke GmbH, Velten/Mark. MG SA
- hfr: Sachs & Deisselberg, Hamburg 11. L
- hft: H. Becker & Co. GmbH, Berlin C2. L
- hgs: Gustav W.C. Burmester, Trittau Bezirk Hamburg. PY SAA
- hhv: Steyr-Daimler-Puch AG, Nibelungen St. Valentin. SA
- hhw: Metallwerke Silberhütte GmbH, St. Andreasberg in Harz. SAA
- hig: Kimnach & Brunn, Kaiserslautern. L
- hjh: Carl Ackva, Bad Kreuznach. L
- hla: Metallwarenfabrik Treuenbrietzen GmbH, Sebalduhof. SAA
- hlb: Metallwarenfabrik Treuenbrietzen GmbH, Selterhof. SAA
- hlc: Zieh- und Stanzwerk GmbH, Schleusingen/Thüringen. SAA
- hlu: Gesellschaft für Verwertung chemischer Erzeugnisse mbH, Hessisch-Lichtenau. PY
- hlv: Maury & Co., Offenbach am Main. L
- hre: C.W. Motz & Co., Metallwarenfabrik, Brandenburg an der Havel. CC
- hrn: Presswerk GmbH, Metgethen in Ostpreussen. SAA
- hsy: Franz Cobau, Belin-Reinickendorf. L
- htg: Polte-Werke, Duderstadt. SAA
- i: Elite Diamantwerke AG, Siegmars-Schönau bei Chemnitz. B
- jba: A. Wunderlich Nachf., Berlin-Neukölln. L
- jhg: Gustav Genschow & Co. AG, Altstadt-Hachenburg, Westerwald. L
- jhs: Landeslieferungs-genossenschaft des Sattlerhandwerks im Reichsgau Danzig-Westpreussen eGmbH, Danzig. L
- jhv: Metallwaren-, Waffen- und Maschinenfabrik AG, Budapest, Hungary. P R SA
- jhz: Jean Weipert, Offenbach am Main. L
- jkg: Königliche ungarische Staatliche Eisen-, Stahl- und Maschinenfabriken, Budapest, Hungary. SA
- jkh: Carl Busse, Mainz. L
- jlj: Heeres-Zeugamt, Ingolstadt, Bayern. L
- jln: Deutsche Lederwerkstätten GmbH, Pirmasens. L
- jme: Armeemarinehaus, Inh. Deutscher Offizier-Verein, Berlin-Charlottenburg. L
- joa: Dresdner Koffer- und Taschenfabrik Carl Heinichen, Dresden A21. L
- jua: Danuvia Waffen- und Munitionsfabriken AG, Budapest, Hungary. SA SAA
- jvb: Wessel & Müller, Luckenwalde. OPT
- jvf: Wilhelm Brand, Heidelberg. L
- jwh: Staatliche Waffenfabrik, Châtellerault, France. B SA
- jxh: F.W. Kinkel, Mainz. L
- k: Luck & Wagner, Suhl, Thüringen. SA
- kam: Hugo Schneider AG, Skarzysko-Kamienna, Poland (later 'Hasag Eisen- und Metallwerke GmbH'). SAA
- kdj: Ungarische Metallplattenindustrie, Budapest, Hungary. SAA
- kfa: Staatliches Arsenal, Sarajewo, Yugoslavia. SA
- kfk: Dansk Industri Syndikat AS 'Madsen', Kopenhagen. SA
- kjj: Askania-Werke, Berlin-Friedenau. OPT
- klb: J.F. Eisfeld, Pulver- und Pyrotechnische Fabriken GmbH, Kieselbach. PY
- kls: Steyr-Daimler-Puch AG, Warschau, Poland. SA
- kot: Adalbert Fischer, Berlin C2. L
- krd: Lignose AG, Kriewald (later 'Sprengstoffwerke Oberschlesien GmbH'). SAA
- krl: Dynamit AG, vormals Alfred Nobel & Co., Krümmel. SAA
- krm: C. Pose, Berlin O34. L
- krq: Emil Busch AG, Rathenow. OPT
- ksb: Manufacture Nationale d'Armes de Levallois, Levallois-Perret, Paris. SAA
- kun: J.F. Eisfeld, Pulver- und Pyrotechnische Fabriken GmbH, Kunigunde. PY
- kuu: Carl Henkel, Bielefeld. L
- lae: Heinrich Zeiss/Union Zeiss KG, Gostingen/Wartheland. OPT
- ldb: Sprengstoff und pyrotechnische Fabriken vorm. Lechfeld & Depyfag GmbH, Berlin-Malchow (later 'Deutsche Pyrotechnische-Fabrik'). PY SAA
- ldc: Sprengstoff und pyrotechnische Fabriken vorm. Lechfeld & Depyfag GmbH, Cleeborn (see above). PY SAA
- ldn: Sprengstoff und pyrotechnische Fabriken vorm. Lechfeld & Depyfag GmbH, Neumarkt/Oberpfalz (see above). PY SAA
- lgp: Veltener Maschinenbau GmbH, Velten/Mark. MG SA
- lkm: Munitionsfabriken vorm. Sellier & Bellot, Prag, Prag-Veitsberg. SAA
- lkq: Elwezet Lederwarenfabrik Werner Zahn, vorm. Fürst & Hoeft, Berlin SW68. L
- lmq: Carl Zeiss, Jena. OPT
- lpg: Servotechna AG, Prag, Czechoslovakia. SAA
- lwg: Optische Werke Osterode GmbH, Freiheit bei Osterode im Harz. OPT
- lza: Mauser-Werke AG, Karlsruhe/Baden. A MG SA
- ma: F.A. Lange Metallwerke AG, Aue/Sachsen. SAA
- mog: Deutsche Sprengchemie, Moschwig. PY
- mpu: Wlaschimer Maschinenfabrik GmbH, Prag XI, Werk in Wlaschim. CC
- na: Westfälische Kupfer- und Messingwerke AG vorm. Caspar Noell, Lüdenscheid in Westfalen. SAA
- nbe: Hasag Eisen- und Metallwerke GmbH, Apparatebau Tschenstochau. SAA
- ndn: Heinrich Blücher, Spremberg. SAA?
- nea: Walter Steiner Eisenkonstruktionen, Suhl. MP SAA
- nec: Waffenwerke Brünn AG, Prag, Werk V, Gurein. SA
- nfx: RWS Munitionsfabrik GmbH, Warschau-Praga, Poland. SAA
- nyw: Gustloff-Werke, Meiningen. A MG SA
- nzz: Max Oswald, Karlsruhe. L
- oa: Eduard Hueck, Lüdenscheid in Westfalen. SAA
- oaz: Max Oswald, Karlsruhe. L
- oma: Ernst Mahla, Prag-Michl. SAA
- otg: Heinrich Hinkel, Mülheim am Main. L
- ovt: Josto-Lederwarenfabrik, Prag XI. L
- oxo: Teuto Metallwerke, Osnabrück. SAA
- oyj: Ateliers de Construction de Tarbes. SAA
- P: Polte Armaturen- und Maschinenfabrik AG, Magdeburg, Sachsen (later renamed 'Polte-Werke'). SAA
- pjj: Staatliche Munitionsfabrik, Kopenhagen, Denmark. SAA
- pvf: C. Reichert, Wien. OPT
- qa: William Prym, Stollberg/Rheinland. SAA
- qrb: Pirotecnico di Bologna, Italy. SAA
- qve: Carl Walther Waffenfabrik, Zella-Mehlis, Thüringen. SA
- r: Westfälisch-Anhaltische Sprengstoff AG, Reinsdorf. SAA
- ra: Deutsche Messingwerke, Carl Eveking AG, Berlin-Niederschönweide. SAA
- rin: reportedly Carl Zeiss, Jena. OPT
- s: Dynamit AG, vormals Alfred Nobel & Co., St. Lambrecht. SAA
- sgx: believed to be E. & F. Hörster, Solingen. B SA
- suk: believed to be the Karlsruhe-Durlach factory of Deutsche Waffen- und Munitionsfabriken. SAA
- svw: Mauser-Werke AG, Oberndorf am Neckar. P R MG SA
- t: Dynamit AG, vormals Alfred Nobel & Co., Troisdorf/Rheinland. SAA
- ta: Dürener Metallwerke AG, Hauptverwaltung Berlin-Borsigwalde. SAA
- ua: Osnabrücker Kupfer- und Drahtwerke AG, Osnabrück. SAA
- va: Kabel- und Metallwerke Neumeyer AG, Nürnberg. SAA
- w: Gesellschaft für Verwertung chemischer Erzeugnisse mbH, Wolfratshausen. SAA
- wa: Hugo Schneider AG, Abteilung Lampenfabrik, Leipzig O5 (later 'Hasag Eisen- und Metallwerke GmbH'). SA SAA SP
- wb: Hugo Schneider AG, Berlin-Köpenick (see above). SAA
- wc: Hugo Schneider AG, Meuselwitz/Thüringen (see 'wa'). SAA
- wd: Hugo Schneider AG, Taucha bei Leipzig (see 'wa'). SAA
- we: Hugo Schneider AG, Langewiesen, Thüringen (see 'wa'). SAA
- wf: Hugo Schneider AG, Kielce (see 'wa'). SAA
- wg: Hugo Schneider AG, Altenburg in Thüringen (see 'wa'). SAA
- wh: Hugo Schneider AG, Eisenach (see 'wa'). SAA
- wj: Hugo Schneider AG, Oberweissbach (see 'wa'). SAA
- wk: Hugo Schneider AG, Schlieben (see 'wa'). SAA
- wm: Hugo Schneider AG, Dermbach/Thüringen (see 'wa'). SAA
- xa: Busch-Jaeger, Lüdenscheider Metallwerke AG, Lüdenscheid in Westfalen. SAA
- y: Jagdpatronen-, Zündhütchen- und Metallwarenfabrik AG, Budapest, Werk Nagyteteny. SAA
- ya: Sächsische Metallwarenfabrik August Wellner Söhne AG, Aue/Sachsen. SAA
- z: Waffenwerke Brünn AG, Považka Bystrica (?). SAA
- zb: Kupferwerk Ilseburg AG, Ilseburg/Harz. SAA

## APPENDIX TWO

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Parading the old Imperial Colours on Volkstrauertag. Berlin, c.1932. *LPI archives*.

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